

Worcester Polytechnic Institute Digital WPI

Interactive Qualifying Projects (All Years)

Interactive Qualifying Projects

February 2008

The Feasibility of Alternative Livelihoods for the Fishermen of Hong Kong

Brendan Matthew McMasters

Worcester Polytechnic Institute

Katherine C. Levinson

Worcester Polytechnic Institute

Olga Lorena Guizado

Worcester Polytechnic Institute

Shannon T. Brooks

Worcester Polytechnic Institute

Follow this and additional works at: <https://digitalcommons.wpi.edu/iqp-all>

Repository Citation

McMasters, B. M., Levinson, K. C., Guizado, O. L., & Brooks, S. T. (2008). *The Feasibility of Alternative Livelihoods for the Fishermen of Hong Kong*. Retrieved from <https://digitalcommons.wpi.edu/iqp-all/2843>

This Unrestricted is brought to you for free and open access by the Interactive Qualifying Projects at Digital WPI. It has been accepted for inclusion in Interactive Qualifying Projects (All Years) by an authorized administrator of Digital WPI. For more information, please contact digitalwpi@wpi.edu.

Faculty code: PWD, Sequence #: HK06; IQP division: 49
**The Feasibility of Creating Alternative Livelihoods for the Fishing Community
in Hong Kong**

An Interactive Qualifying Project Report
submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for the
Degree of Bachelor of Science

Sponsoring Agency: Word Wide Fund for Nature

Submitted to:

Project Advisor: **Paul Davis**, WPI Professor
Project Co-advisor: **Kevin Clements**, WPI Professor
On-Site Liaison: **Dr. Andy Cornish**, Director of Conservation
Mr. Clarus Chu, Marine Conservation Officer

Submitted By:

Shannon Brooks

Olga Guizado

Katy Levinson

Brendan McMasters

Date: 29 February 2008

Abstract

This project, completed for the World Wide Fund for Nature, identifies and evaluates alternative livelihoods for the fishermen in Hong Kong. We identified the skills that the fishermen possess and their willingness to switch careers. We evaluated government programs that are being offered for re-training and re-employment, and potential employers. We concluded that none of the careers researched are feasible for the fishermen. The WWF should let the older population of fishermen retire and focus more on the re-education of younger fishermen.

Acknowledgment

We would like to thank Professor Paul Davis and Professor Kevin Clements for their continuous support and guidance throughout our project. We would also like to thank our sponsors at the World Wide Fund for Nature, Clarus Chu, Hiu Yan Li and Andy Cornish as well as the various volunteers who helped us translate and conduct our surveys. Finally, we would like to thank the fishermen of Hong Kong for participating in our survey as well as the following people for taking the time out of their busy schedules to speak with us.

- Dr. Yiu Ming, Mak – Fisheries Officer, Agriculture, Fisheries and Conservation Department
- Professor Put O, Ang – Marine Biologist, Chinese University of Hong Kong

Authorship

Authorship Key:

Shannon Brooks (SB)

Olga Guizado (OG)

Katy Levinson (KL)

Brendan McMasters (BM)

(Main author, first editor, second editor (as needed))

Abstract (OG)

Acknowledgment (SB, BM)

Executive Summary (BM)

1.0 Introduction (OG/SB/BM/KL, OG/SB/BM/KL)

2.0 Background (SB)

2.1 Over-fishing (KL, BM)

2.1.1 Portugal (OG)

2.1.2 South Africa (BM, SB)

2.1.3 USA (BM, SB)

2.1.4 Conclusion (OG)

2.2 Current Global Response Strategies (SB)

2.2.1 Re-education (BM)

2.2.2 UK Seafarers Program (BM, SB)

2.2.3 USA Re-Employment Programs (BM, OG)

2.2.4 Seaweed Farming in the Philippines (OG)

2.2.5 Algae Farming (KL, OG)

2.2.6 Conclusion (SB)

2.3 Tourism (BM)

2.3.1 Tourism in Jamaica (SB)

2.3.2 Tourism in Hong Kong (SB)

2.3.3 Conclusion (SB)

2.4 Employment Information in Hong Kong (KL)

2.4.1 Age Discrimination (KL, BM)

2.4.2 Unemployment (OG)

2.4.3 Job Market (BM)

2.4.4 Average Wages (KL, SB)

2.4.5 Interactive Employment Service (BM)

2.5 Training Programs in Hong Kong (OG)

2.5.1 Vocational Training Program (OG)

2.5.2 Taxi Training Program (OG)

2.6 Job Placement Possibilities (BM)

2.6.1 Shipping Work (KL, BM)

2.6.2 Pollution Control Unit (KL, BM)

2.7 Types of Boats (KL, BM)

2.8 World Wide Fund for Nature Previous Study (KL)

2.9 Conclusion (SB)

3.0 Methodology (BM)

3.1 Survey of fishermen (SB, OG, SB)

- 3.2 Interviews with government officials (OG, SB)
- 3.3 Interview with Marine Biologist (OG)
- 3.4 Interviews with potential employers (KL, OG, SB)
- 3.5 Conclusion (BM)
- 4.0 Data (SB, BM)
 - 4.1 Interviews (OG)
 - 4.1.1 Interview with Dr. Mak (SB)
 - 4.1.2 Interview with Professor Put (OG, BM, OG)
 - 4.1.3 Labour Department Programs (SB, OG)
 - 4.1.4 Interviews with Potential Employers (BM, SB)
 - 4.2 Surveys of Fishermen (BM, SB)
 - 4.3 Informal Observations (SB)
- 5.0 Analysis (BM, OG)
 - 5.1 Re-employment (SB)
 - 5.1.1 Seaweed Farming & Mariculture (BM, OG)
 - 5.1.2 Star Ferry (OG, SB)
 - 5.1.3 Shipping Work (KL, SB)
 - 5.1.4 Pollution Control Unit (KL, SB)
 - 5.2 Re-training (BM, OG)
 - 5.2.1 English Courses (BM, OG)
 - 5.3 Effectiveness of Government Re-Employment Programs (BM, SB)
 - 5.4 Comparison of Results to Previous WWF Study (KL, OG)
 - 5.4.1 Trawlers (KL, OG)
 - 5.4.2 Transitioning to New Careers (KL, OG)
 - 5.4.3 Age Distribution (KL, OG)
 - 5.4.4 Other Similar Observations (KL, OG)
 - 5.5 Conclusion (SB, OG)
- 6.0 Conclusions and Recommendations (SB)
 - 6.1 Potential Re-employment Opportunities (BM)
 - 6.1.1 Seaweed and Algae Farming (SB, OG, SB)
 - 6.1.2 Ferry Industry Positions (OG, BM)
 - 6.1.3 Pollution Control Unit (KL, SB)
 - 6.1.4 Mariculture (BM, SB)
 - 6.1.5 Tourism (SB, OG)
 - 6.2 Conclusions on Government Programs (SB)
 - 6.2.1 Interactive Employment Service (BM, SB)
 - 6.2.2 Employment Programme for the Middle-aged (SB, OG)
 - 6.3 Conclusions on Lifestyle of Fishers (OG)
 - 6.3.1 Children of Fishers (OG, SB)
 - 6.3.2 Aging of Fishing Population (SB, OG)
 - 6.3.3 Willingness of Younger Fishers (BM, SB)
 - 6.4 Recommendations (SB)
 - 6.4.1 Alternative Livelihood Options (BM, SB)
 - 6.4.2 Development of New Programs (OG, SB)
 - 6.4.3 Shift Focus to Next Generation (KL, SB)
- References (SB/OG/KL/BM, KL)
- Appendices
 - Appendix A: What is an IQP (BM)
 - Appendix B: World Wide Fund For Nature Fund Background (BM)
 - Appendix C: Survey of Fishermen (BM)

Appendix D: Interview Protocol for Employment Agency – USA (BM)
Transcript for Stephen McDonough Interview (BM)
Appendix E: Interview Protocol for Agriculture, Fisheries, and Conservation Department (BM)
 Transcript for Mak Yiu-ming Interview
Appendix F: Interview Protocol for Marine Biologist (BM)
 Transcript for Professor Put Ang Interview
Appendix G: Interview with Star Ferry Company (OG)
 Star Ferry Interview
Appendix H: Correspondence Exchange with the Labour Department (OG)
 Response from Labour Department
Appendix I: Interview with Fishing Family (BM)
 Transcript for Li Kui Fung
Appendix J: Interview with Ex-fisher Family (OG)
 Interview With Ms. Winnie Lee
Appendix K: Map of Surveyed Area (KL)
Appendix L: Raw Survey Data (BM)
Appendix M: List of Boats (KL)
Appendix N: Compiled Survey Data (KL, BM)

Table of Contents

Abstract	ii
Acknowledgment	iii
Authorship.....	iv
Table of Contents	vii
Table of Figures	x
Executive Summary	xi
1.0 Introduction.....	1
2.0 Background	4
2.1 Over-fishing	4
2.1.1 Portugal	5
2.1.2 South Africa	7
2.1.3 USA.....	8
2.1.4 Conclusion	10
2.2 Current Global Response Strategies.....	10
2.2.1 Re-education	10
2.2.2 UK Seafarers Program	11
2.2.3 USA Re-Employment Programs	11
2.2.4 Seaweed Farming in the Philippines	14
2.2.5 Algae Farming.....	14
2.2.6 Conclusion	15
2.3 Tourism.....	15
2.3.1 Tourism in Jamaica.....	15
2.3.2 Tourism in Hong Kong.....	16
2.3.3 Conclusion	17
2.4 Employment Information in Hong Kong	17
2.4.1 Age Discrimination	17
2.4.2 Unemployment.....	18
2.4.3 Job Market.....	19
2.4.4 Average Wages	19
2.4.5 Interactive Employment Service	20
2.5 Training Programs in Hong Kong	20
2.5.1 Vocational Training Program.....	20
2.5.2 Taxi Training Program	21
2.6 Job Placement Possibilities	21
2.6.1 Shipping Work.....	21
2.6.2 Pollution Control Unit.....	22
2.7 Types of Boats.....	23
2.8 World Wide Fund for Nature Previous Study	24
2.9 Conclusion.....	27
3.0 Methodology	29
3.1 Survey of fishermen	29
3.2 Interviews with government officials.....	30
3.3 Interview with Marine Biologist	30
3.4 Interview with potential employers.....	31
3.5 Conclusion.....	31

4.0 Data.....	32
4.1 Interviews	32
4.1.1 Interview with Dr. Mak	32
4.1.2 Interview with Professor Put	33
4.1.3 Labour Department Programs	35
4.1.4 Interviews with Potential Employers	35
4.2 Surveys of Fishermen.....	36
4.3 Informal Observations.....	43
5.0 Analysis.....	45
5.1 Re-employment	45
5.1.1 Seaweed Farming & Mariculture	45
5.1.2 Star Ferry.....	46
5.1.3 Shipping Work.....	46
5.1.4 Pollution Control Unit.....	47
5.2 Re-training.....	47
5.3 Effectiveness of Government Re-Employment Programs	48
5.4 Comparison of Results to Previous WWF Study	48
5.4.1 Trawlers.....	48
5.4.2 Transitioning to New Careers.....	49
5.4.3 Age Distribution.....	50
5.4.4 Other Similar Observations	50
5.5 Conclusion.....	50
6.1 Potential Re-employment Opportunities.....	52
6.1.1 Seaweed and Algae Farming	52
6.1.2 Ferry Industry Positions	52
6.1.3 Pollution Control Unit.....	53
6.1.4 Mariculture.....	53
6.1.5 Tourism	54
6.2 Conclusions on Government Programs.....	54
6.2.1 Interactive Employment Service	54
6.2.2 Employment Programme for the Middle-aged.....	54
6.3 Conclusions on Lifestyle of Fishers	55
6.3.1 Children of Fishers	55
6.3.2 Aging of Fishing Population	55
6.3.3 Willingness of Younger Fishers.....	56
6.4 Recommendations	56
6.4.1 Alternative Livelihood Options.....	56
6.4.2 Development of New Programs	57
6.4.3 Shift Focus to Next Generation.....	57
References.....	58
Appendices.....	64
Appendix A: What is an IQP.....	64
Appendix B: World Wide Fund for Nature Fund Background	65
Appendix C: Survey of Fishermen.....	67
Appendix D: Interview with Stephen McDonough (Employment Agency in USA).....	70
Interview Transcript:	71
Appendix E: Interview with Dr. Yiu Ming Mak	74
Interview Transcript:	75
Appendix F: Interview with Professor Ang Put	78
Interview Transcript:	79

Appendix G: Interview with Star Ferry Company	82
Interview Transcript:	83
Appendix H: Correspondence Exchange with the Labour Department	85
Response from Labour Department:	86
Appendix I: Interview with Li Kung Fung (Fishing Family)	88
Interview Transcript:	89
Appendix J: Interview with Winnie Lee (Ex-fisher Family)	91
Interview Transcript:	92
Appendix K: Map of Surveyed Area.....	94
Appendix L: Raw Survey Data	95
Appendix M: List of Boats.....	96
Appendix N: Compiled Survey Data	98

Table of Figures

Figure 1 Age Graph of Fishermen	37
Figure 2 English Learning	38
Figure 3 Retraining Interest	39
Figure 4 Interest in English Courses and Re-training Programs.....	40
Figure 5 Monthly Gross Income	41
Figure 6 Fill Cost vs. Income.....	42
Figure 7 Willingness to Participate in Vessel Buy Back Program based on Boat Size.....	43

Executive Summary

Approximately 800 fishermen in Hong Kong are currently facing unemployment and need to seek alternative livelihoods because of the over-fishing problem within the local waters. Currently there are several “no-take zones” in place which are meant to protect the marine environment, but they only occupy approximately .016% of Hong Kong’s ocean area. These no take zones are locations in which both fishing and trawling are not allowed. Expanding the no-take zones is challenging because most of the fishermen in Hong Kong were born into the fishing industry and fishing is all that they are familiar with. Although the government has been aware of the problem of low fish populations for many years, they finally seem willing to help develop a program in which the fishermen can find alternative livelihoods.

Currently around the globe, over-fishing is a very serious issue. Some countries such as Jamaica, the Philippines, the United States, the United Kingdom, and South Africa, are working to provide feasible solutions to the problem. Jamaica, for example, has found that tourism is a viable alternative career for fishermen. The United Kingdom has created Seafarers UK, a charitable umbrella organization designed to protect the welfare of fishermen. The Philippines, on the other hand, has been developing seaweed farming as an alternative career for fishermen. As demonstrated in these countries, there are possible solutions that are effective in reducing over-fishing. We have studied the feasibility of these occupations in Hong Kong SAR.

In order to evaluate the current employment situation of fishermen, we conducted surveys of a random population set within the fishing population. Information collected during the surveys included data such as the age and income of the fishermen, as well as skills possessed by the fishermen, willingness to attend training, and views on government programs. From the

interviews, we also collected information about the related government agencies (the Agriculture, Fisheries, and Conservation Department and the Labour department) and potential programs that had been used in the past. From the Agriculture, Fisheries, and Conservation department, we identified the feasibility of possible jobs in the tourism industry and current government funded retraining programs available for other careers. Another interview that we conducted with a marine biologist, gave more insight into the plausibility of careers in marine farming. Finally, the team conducted interviews with families of fishermen and ex-fishermen. Through these interviews, we gained a more in-depth view of the opinions of fishermen which were not always elicited during surveys due to time constraints.

After analyzing the data from the surveys and the interview results, we determined that the solution of identifying alternative livelihoods for the entire population was not feasible. This was mainly due to the age and lack of skills possessed by a large portion of the surveyed population. From the data, we concluded that the youngest generation of fishermen, those under the age of 40, would be most willing to adapt to alternative livelihoods. Through our research, it was determined that the current re-employment agencies and programs do not meet the schedule and training needs required by the fishermen. We have recommended that the government develop programs designed to fit the specific needs of the fishermen and that there are subsidies for job training and re-employment for fishermen. Alongside the development of new programs, we recommended the implementation of the vessel buy back program proposed by the government to help fishermen out of the fishing industry. The vessel buy back program could be coupled with a retirement program that would ease the transition for the older fishermen when leaving the industry. If the Hong Kong government implements these recommendations, we believe that after several years of transition, the marine ecosystem of Hong Kong will be

preserved and there will be a reduced number of fishermen present in the fishing industry

1.0 Introduction

Over-fishing is a global threat to many marine ecosystems and to the people who depend upon those ecosystems for food and livelihood around the world. Due to an increase in consumer demand for fish, there has been a rise in the number of fishermen as well as fishing vessels, which is contributing to this problem. The over-fishing problem is responsible for the reduced profit for the fishers and destruction of ecosystems. If this problem is allowed to continue much longer, certain over-fished species will go extinct. Over-fishing is occurring in waters off the coast of Portugal, South Africa, and the United States in their over-fishing of cod, sardines and hake. One of the most destructive cases of the over-fishing problem can be seen in Hong Kong.

Following the pattern of most over-fished coastal areas around the world, Hong Kong has been forced to try to develop methods to revitalize the endangered fish populations. So far, the Hong Kong Special Administrative Region (HKSAR) has tried to apply a no-take policy for some of the waters surrounding Hong Kong. Historically these “no-take zones” have been implemented to permit fish stocks to re-grow, but in Hong Kong these have had little to no impact as the government still permits fishing in these national marine parks (SOS, 2007). Unfortunately, these no-take zones are very small and only cover approximately 0.016% of the local waters surrounding Hong Kong. The shortage of fish due to over-fishing is beginning to lead to unemployment as well as a need for re-education of fishermen. The fishermen of Hong Kong do not have much formal education, and most have been fishing for their entire lives. Therefore, in order to employ these fishermen in other sectors of the economy, they need to undergo some form of re-education in a different industry or field of work.

The re-education of fishermen, which is targeted to occur in Hong Kong, will start to use

government funded organizations to complete the career transitions from fishing to other jobs. In other parts of the world such as the UK, there are organizations solely concerned with the well being and employment of fishing populations such as Seafarers UK. Seafarers UK provides charitable funding and resources to help with the livelihoods and well being of Navy officers, maritime workers, and fishermen. Organizations such as these can help to find an answer to over-fishing by finding alternate livelihoods for the fishing population.

A combination of the low levels of formal education of fishermen and a shortage of job opportunities in Hong Kong make finding alternate livelihoods for fishermen a difficult task. Currently, the only known fact is that there needs to be a severe decrease in the fishing population. One potential option for the fishermen, which is already being considered, is to develop the marine tourism industry as an alternative livelihood. Unfortunately, research has shown that this option will provide less than a quarter of the number of jobs necessary to reduce the population of fishers to a sustainable level.

Our project's main goal, in response to over-fishing and excess fishermen, was to determine the feasibility of alternative careers or livelihoods for the fishermen in Hong Kong. The first objective that was completed in order to attain our goal was to identify skills, income, and education currently possessed by fishermen in Hong Kong, as well as potential jobs that can employ fishermen with their current skills and formal education levels. Also, we identified the availability of government resources to utilize for the employment of fishermen in these new job fields. We interviewed members of the fishing community, government officials, and potential employers. This research helped to improve the marine ecosystems surrounding Hong Kong by re-employing the fishermen and allowing fish populations to re-grow. In the future, this research

will also be beneficial to other fishing populations around the world in finding alternative livelihoods.

2.0 Background

This chapter will discuss the problem of over-fishing in different parts of the world and the strategies that different countries have used to overcome the problem of over-fishing, including re-employment programs for fishers. We also provide background information about the tourism industry in different places of the world and employment information for Hong Kong as well as discussing re-education programs that are being offered in Hong Kong today.

2.1 Over-fishing

Over-fishing in Hong Kong is a serious problem causing the fish to go extinct. For years the incredibly destructive practice of bottom trawling, which is commonly compared to the act of collecting trees by forest clear-cutting (United Nations System Wide Earth Watch, 2006), has caused the widespread destruction of marine life in the pursuit of fish of commercial value in Hong Kong (WWF SOS Campaign, 2006).

Bottom trawling, also known as Benthic trawling by the scientific community, is the practice of dragging large nets across the bottom of the ocean that bring everything in the net's path back to the surface. The results are then sorted and the undesired wildlife (which is more than half the catch) is thrown back into the ocean dead. This practice has caused the number of fish as reported by fishermen in Hong Kong to sharply decrease (WWF SOS Campaign, 2006) and has reportedly pushed the local fishermen to fish more aggressively and thoroughly in order to make a simple day's catch.

Historically several no-take zones have been implemented to permit fish stocks to re-grow, but these have had little to no impact as the government still permits fishing in these

national marine parks (WWF SOS Campaign, 2006). This section examines over-fishing problems in Portugal, South Africa, and United States. These countries have had over-fishing problems for quite a while and have already implemented many laws to help deal with this issue. For example, there are now fish quotas per fishermen which prevent over-fishing in some areas. This in turn has begun to force fishermen into alternative careers in many cases because of the strict competition of the fishing industry.

2.1.1 Portugal

The fishing industry in Portugal started having problems in the 90's. "The annual catch declined in 1995 because Portugal was affected by internationally-set limits (Total Allowable Catches) that restrict fishing access for certain species in the international waters of the North Atlantic and by EU fishing quotas" (Encyclopedia of the Nations, Europe, 2007) meaning that their fishing industry suffered when they joined the European Union because of the new regulations that they enforced; "the fishing fleet dropped from 12,299 vessels of all kinds in 1994 to 10,933 in 1999, while the number of registered fishing workers fell from 31,721 to 27,191" (Cristovam, 2000, para. 2).

The government of Portugal was also having problems finding career alternatives for the fishermen especially because most of them were old. That is the same kind of problem that Hong Kong is having today. The purposes of the EU policies were to "determine priorities which will contribute to a sustainable balance between fisheries resources and their exploitation; to increase the competitiveness of fishing enterprises and organizations; and to develop viable enterprises" (Cristovam, 2000, para. 3).

The fishing industry in Portugal is divided into industrial fishing and artisanal fishing.

Artisanal fishing is “a dynamic activity that can range from sedentary to migrant fishers or communities, from part-time to full-time fishing activity, from subsistence to commercial fishing and from non-advanced and non-differentiated to highly differentiated and specialized fishing” (Demuynck, 1994); about 80% of the workers work in the artisanal sector. The two sectors started to have different problems due to the new policies. The artisanal sector faced problems with "the fuel price policy, the taxation regime applicable to the industry, and the social security contribution regime" (Cristovam, 2000, Working conditions section, para. 1). These problems seemed to be damaging all the people working in the artisanal sector. The workers in this sector faced more problems than the workers in the industrial fishing sector because their income depends directly on how many fish they catch. In other words, their income is dependent on their haul. During the year 2000, the haul of fish, such as sardines, fell 40%. The industrial fishing workers in Portugal suffered from the EU regulations because they could not fish as much as they could before. That made their fleet decrease significantly. The EU regulations had negative effects on the industrial fishing sector, but they also had some positive effects on the fishermen. Because of the new regulations, the fishermen won the right to holidays, Christmas bonuses, sick leave, mandatory rest periods and insurance against death.

In the year 2001, the Portuguese social partner organizations and the government signed an intersectoral agreement about employment, the labor market, education, and training. The social partner organizations are made up of "the Confederation of Portuguese Industry (Confederação da Indústria Portuguesa, CIP), the Portuguese Trade and Services Confederation (Confederação do Comércio e Serviços de Portugal, CCP), the Portuguese Farmers' Confederation (Confederação dos Agricultores de Portugal, CAP), the General Portuguese Workers' Confederation (Confederação Geral dos Trabalhadores Portugueses, CGTP), and the

General Workers' Union (União Geral de Trabalhadores, UGT)" (Almeida and Cristovam, 2001, para. 3). The purpose of this agreement was to "overcome weaknesses in education and vocational training, encourage high-quality employment and introduce active and integrated policies to combat unemployment, as well as to promote equal opportunities" (para. 4).

Even though the implementation of the agreement helped to educate the fisher's population as well as other populations of Portugal, there is always room for improvement, especially in the area of vocational training. In the year 2006, the bipartite agreement on vocational and educational training (VET) was signed. The purpose of the pact was to "to improve the implementation of Labor Code measures that resulted from the tripartite social pact set up in February 2001. It also aims to include VET as a priority in collective bargaining, to strengthen the social partners' position in all relevant bodies concerning VET, and to create new tools to support and monitor VET " (Campos and Naumann, 2006, para. 1).

The first implementation of vocational training programs in Portugal was in the year 1998, but not many companies would recognize this type of program; in other words, not many companies would hire graduates of these programs. That is why the government has decided to improve its programs and has been signing different agreements throughout the years in order to help decrease the unemployment rate among fishermen in Portugal.

2.1.2 South Africa

Over the past few decades, South Africa has been experiencing much difficulty controlling over-fishing in its marine territories. In 1999 the Department of Environmental Affairs and Tourism drew up the "Marine Living Resources Act" to help protect the fish and reverse the effects of over-fishing (Thinkquest, 2006). Among the populations that are currently

being over-fished are the South Coast Rock Lobster, the West Coast Rock Lobster, and the Linefish.

Actions that have been taken against over-fishing include setting annual fishing quotas, enforcing a fishing season, and prohibiting other countries from fishing in South African waters. With these laws in place many fishers are now claiming that the quota laws are beginning to threaten their livelihood and might force fishermen out of the fishing industry. The problem as stated by one fisherman, "It's the people who've got money and who are more involved with the politicians, those are the people who get the quotas" (Bartlett, 2002, para. 2).

With the livelihoods of fishermen threatened, some of the members of the fishing community are facing unemployment. Unemployment is even more threatening in South Africa, where national employment rates are near 25%, compared to Hong Kong's 4.9% (CIA, 2006). Also, on top of the unemployment rate, some parts of South Africa are also heavily reliant on the fishing industry which has caused species such as the Linefish to fall below the survivable 25% threshold (ScienceAfrica, 2002, para. 4). This threshold is defined as the minimum population needed for natural re-population.

2.1.3 USA

As a result of an increase in the number of fishermen and fishing vessels, the U.S. is, like other fishing countries, researching the negative effects of over-fishing. U.S. marine fisheries are working to improve the conservation of protected species as well as reverse the over-fishing trends. From 1976 to 1995, there was a 40 percent increase in the number of U.S. fishing vessels and an increase in the number of fishermen by 60 percent (Buck, 1995). These increases have resulted in a 50 percent increase in catches, due to more boats being on the water. In 1993, 65 of

the United States' 231 marine fish stocks were classified as over fished because the increase in catches has rapidly deteriorated the fish population. This is a serious problem that is endangering the livelihoods of many American fishermen as well as the marine ecosystems off the U.S. coast. Recently, over-fishing has led to the mismanagement of fisheries, the loss of billions of dollars every year in revenue and the unnecessary use of government subsidies to support unsustainably large fishing fleets (Buck, 1995).

The government has developed options to help manage the redevelopment of the marine ecosystem resources. A set of criteria has been developed to effectively implement the management of over-fishing (Buck, 1995). This includes setting clear goals and standards for improvement as well as several other guidelines. The management techniques employed by the U.S. can be adapted to fit other communities around the world that are facing the dangers of over-fishing.

Serious regulation began in 1996 with the passing of the Magnuson-Stevens Fishery Conservation and Management Act. This act established Regional Fishery Management Councils to monitor local fishing areas and determine fishing quotas with consideration for both the environmental needs and the economic needs of the surrounding districts. These Regional Fishery Management Councils were also required to consider that additional protection would be required for young fish, systems would need to be put in place to prevent by catch, and that protection must be enacted to ensure that appropriate proportional species diversity was maintained in all areas. It also set regulations on foreign fishers who fished within American waters and enacted special regulations for a coastal area of the Pacific Ocean.

In 2007 the Magnuson-Stevens Fishery Conservation and Management Reauthorization

Act of 2006 provided further regulations. It required that the individuals who set annual catch limits in each area be appointed professionals with a scientific background instead of political. It also had greater implications on the global fish market as the new law permitted America to close its domestic ports to countries whose boats partake in illegal over-fishing. Local fishermen who break the laws on over-fishing can lose the normal quota they are permitted. The law aimed to put these restrictions on fishermen 3 years after it was passed for threatened species of fish and 4 years for all fish.

2.1.4 Conclusion

Over-fishing is an issue that effects many populations around the world. To eliminate this issue, many communities are working to develop a set of solutions to improve the conditions of the fishing industry and save the marine ecosystems. One of the most viable options for improvement is to determine alternative livelihoods for many of the fishermen. However, there are some complications that can make reemployment of the fishermen difficult. Most of the fishermen have been born into the fishing industry and have never known any other way of life. Due to the fishermen's low level of formal education and the need for a transition into other livelihoods, some sort of re-education training is usually needed.

2.2 Current Global Response Strategies

Some countries such as the United Kingdom and the United States are using re-education programs as a solution to their unemployment problems. These re-education programs are helping people find different or more desirable career opportunities.

2.2.1 Re-education

Re-education programs are a large part of the employment world. Even without the issue

of over-fishing, there is still a need for these programs. Looking into the UK, USA, and Philippines we are able to see alternate programs for previously employed individuals. These programs have shown a promising response to the difficulties of finding new jobs for fishermen.

2.2.2 UK Seafarers Program

The UK, like many other countries, offers adult education services to re-educate the unemployed or underemployed population. The difference between the UK and other countries is the Seafarers UK program, which is directly concerned with the employment and well being of the fishing population. The only other countries that have similar programs are located in India and Africa and are referred to as the “National Scheme of the Welfare of Fishermen”. Over the last ten years Seafarers UK has granted £28 million and their work continues with particular emphasis on elderly seafarers, serving seafarers, and maritime trainees. (Seafarers UK, 2007).

The main concept of Seafarers UK is that it is an umbrella charity organization that provides charitable money to programs for fishermen. Other organizations which help fishermen and also control fishing regulations in the UK include the National Federation of Fishermen Organization. This organization in the past has had to deal with a decrease in the cod populations off the coast of the UK. In dealing with this they made sure to set regulations in place to prevent fishing of the cod to help stocks recover, and also to try to help fishing vessels into other types of fishing. What has been found in this situation is that if actual strict guidelines are imposed on the fishermen, then they are more likely to obey them instead of just deeming an area a no-take zone.

2.2.3 USA Re-Employment Programs

The USA has unemployment agencies and re-employment via adult education in just about every state. The United States is able to maintain a fairly low unemployment rate of

approximately 4.7% (CIA, 2007), which is due to the job retention rate and also the re-employment programs.

One notable advantage that the United States possesses, along with a handful of other countries, is unemployment insurance. A portion of the federal income tax that is taken from every worker helps to provide unemployment pay and to cover unemployment insurance in the United States. Unlike Canada, any fisherman associated with a US registered fishing vessel is entitled to unemployment insurance (EDD, 2005).

Along with this unemployment insurance, the United States provides many re-education services. One of the primary services is Job Corps, which is a vocational training program for people usually between the ages of 16 and 24 who are seeking employment or re-employment. This allows workers with lower formal education levels such as fishers to be able to find alternate careers with greater ease. Currently Job Corps helps 60,000 youths annually at 122 Job Corps centers throughout the country. Individuals in the Job Corps are trained for many new positions. Some options include: security guard training, culinary arts, and business technology (which is essentially the skills of typing, faxing, answering a phone, and either maintaining a reception desk or being a secretary.) Other options include various health occupations, electrical wiring, facility maintenance (the maintenance of buildings, a small amount of carpentry, plumbing, landscaping, and general repairing skills), plumbing, and medical office technology. This does not represent all of the possibilities, however, as the educational background of the students varies tremendously. While the program was designed for students between the ages of 16 and 24 a much wider variety of people receive assistance from Job Corps. Some individuals come into Job Corps with doctorate's degrees as lawyers and engineers. Training time for new

jobs vary. Normally the time span is between one month and one year. Variations are mainly caused by the type of work the student desires to eventually perform and previous educational background.

The United States is also working on a newly implemented program named the Worker Profiling and Reemployment Service or WPRS. Implementation of the WPRS system is a prominent first step in building a nation-wide re-employment system (US Dept of Labor, 2006). This program is designed to take in information about the status of unemployed workers. It will utilize information about previous jobs and skills and then enter the participants into a database which is intended to help fast track the re-employment process. The system works in a few simple steps. During the initial claims for unemployment insurance individuals are profiled. Information that is likely to be relevant to their future employment is collected and stored. Next, a selection of candidates likely for assistance from the WPRS system is selected. Individuals who plan to use a union hiring hall are removed as well as those who are on recall. Of the remaining the most likely individuals to not find a job before the end of their unemployment insurance without assistance are selected for the WPRS system. Unemployed individuals who are selected are then informed that they are selected and when and where their training and seminars will begin. These individuals will not be eligible to collect the rest of their unemployment benefits if they fail to report to their training. This beginning seminar results in follow-up sessions (which are also required for the individual's benefits to continue) and the level of participation is reported back in weekly certificates. After the program is completed or terminated the individual is required to participate in follow-up information as to what services were useful to the individuals and, if applicable, the employment outcomes of the individual.

2.2.4 Seaweed Farming in the Philippines

A career alternative for fishermen that is being implemented in the Philippines to decrease over-fishing is seaweed farming. The Philippines have been promoting and implementing seaweed farming as an alternative livelihood for fishermen in order to "raise the economic standard of living of fishers and coastal communities, and to reduce fishing effort" (Crawford, 2002, p. 4).

A report written by Padilla and Lampe (1989) stated that "seaweed farming in the Philippines was an attractive economic alternative to fishing" (Crawford, 2002, p. 5) but only 50% of fishermen are willing to become full-time seaweed farmers. The rest of the fishermen prefer to work only part-time as seaweed farmers while dedicating the other half of their time to fishing. According to a Philippines newspaper "approximately 100,000 families depend on seaweed farming for their livelihood" (Crawford, 2002, p.6). Crawford states that there is enough evidence proving that seaweed farming is a profitable livelihood for fishermen, but "it is uncertain whether this is a short-term effect due to market price increases or a long-term result" (Crawford, 2002, p. 7).

2.2.5 Algae Farming

Somewhat related to the concept of seaweed farming is the concept of algae farming. Algae is frequently farmed for a wide range of benefits including being used in health food, antibiotics, beta carotene, Vitamin A (CNN, 2000), and oil for fuel (USA Today, 2006). The real promise of algae farming is the resulting useful product by weight. About half of the mass of each algae cell can be converted to bio-fuel oil. This means that in a given farmed acre of algae 15,000 gallons of oil can be produced. The algae's closest competitor, soybeans, produces only

60 gallons per farmed acre (USA Today, 2006). Algae are also known to thrive on phosphorus, which is the largest pollutant in the Queen Victoria Harbor because of the flow of the Pearl River Delta flowing into it.

2.2.6 Conclusion

Different countries around the globe are applying different strategies to deal with unemployment issues. The United States and the United Kingdom have re-education programs in order to help different populations to get education, consequently becoming more eligible to find a job. These re-education programs can help fishermen get education to find different career opportunities. The Philippines, on the other hand, is promoting seaweed farming as an alternative livelihood for fishermen. Another strategy that is being used around the globe is algae farming.

2.3 Tourism

Tourism has been a beneficial economic option for many developing countries around the world. The tourism industry of a country can prove to be very useful in stimulating the economy and creating many job opportunities. Based on the changes and improvements that have been made to the tourism industry of Jamaica, there may be changes that can be applied to improve tourism within Hong Kong. These changes will permit the creation of new employment opportunities and could be provide many viable alternative livelihood options.

2.3.1 Tourism in Jamaica

The coral reefs and fishing areas of the coast of Jamaica have been damaged by over-fishing. One of the potential solutions included expanding the existing marine park areas. Another solution was to develop other industries such as tourism to help alleviate the over-fishing. In many Caribbean and Pacific islands, the expansion of tourism has helped the

communities in a number of ways by leading to the creation of employment options as well as increasing trade opportunities for foreign-exchange earning and investments (Apostolopoulos, Gayle, 2002, p. 94). Within Jamaica, tourism is the country's biggest industry and provides an opportunity for many of its citizens to find work. Tourism helps to sustain many other aspects of the economy such as agriculture and entertainment. Since the recent changes and improvements to the tourism industry, 34% of Jamaica's workforce depends on tourism (Economic Impacts of Tourism, 2002, para. 15). The improvements that have been made to the tourism of Jamaica may also be applicable to the tourism industry of Hong Kong.

2.3.2 Tourism in Hong Kong

As one of the most popular tourist locations of Pacific Asia, the tourism industry of Hong Kong has been expanding in recent years. (Choi, 2000) People travel from all over the world to enjoy the unique cultural experience that Hong Kong has to offer. Currently, the majority of the tourism is focused on central urban locations. Tourist activities have focused on cities due to the attractions of unique shops and theme-park like venues. The differences and uniqueness of Hong Kong culture attract many tourists to the area. One of the major concerns associated with the rise in tourism is the potential for loss of cultural identity. Researchers are looking to find a balance so that Hong Kong can keep its cultural identity while still allowing for the expansion of tourism. In recent years, developers have been trying to shift the tourist industry away from urban areas and expand to include the extensive country side and undeveloped land within Hong Kong SAR. Another viable option for tourist activity is marine tourism. Parts of the coastal region of Hong Kong remain underdeveloped and could be used more efficiently to help increase tourism. The nature based resources of Hong Kong can easily be developed as a complement to the classic urban tourist attractions (Jim, 2000). Promotion of several different types of tourism could be

very beneficial to Hong Kong, both economically and environmentally. Therefore, jobs created within the expanding tourism industry could prove to be a viable option for the fishermen of Hong Kong.

2.3.3 Conclusion

There are several potential options that could be used to provide alternative livelihoods for fishermen. One of the most viable solutions, as found by the previous marine study by the World Wide fund for nature, is employing the fishermen in the tourism industry. There is potential for improvement based on the results of the expansion of tourism industries in other countries.

2.4 Employment Information in Hong Kong

There are several factors that are contributing to unemployment in Hong Kong. Some of these factors, such as age discrimination, are discussed in the following sections.

2.4.1 Age Discrimination

Age discrimination is a serious problem in Hong Kong. (Chui, S., & Ngan, R. 1999) Normally the elderly people are cared for by their children. People who do not have children generally must work for the rest of their lives instead. These people are considered to be breaking tradition. Many stereotypes exist that the elderly are not as well suited for work as their younger counterparts. A movement was started when Hong Kong was handed over to China to pass an equal-opportunity employment policy regarding the elderly, but this movement appears to not yet have had the full desired effect. This social issue is a potentially serious concern because the project is done in an area with an elderly population. This might make moving the older segment of the population to alternative livelihoods difficult.

2.4.2 Unemployment

The unemployment rate in Hong Kong increased significantly in the year 2003, hitting a new record of 8.7%. This crisis was due to a massive number of graduates entering the already tight labor market. The government of Hong Kong said that the unemployment rate "would remain high as a result of the continued entry of fresh graduates and school leavers into the labor market" (China Daily, 2003, para. 2).

Although the tourism industry faced an increase in the unemployment rate in year 2003, the government was expecting a decrease in the following months. Also, it was confident that the labor market would recover. As expected, the tourism workforce in Hong Kong increased by July 2003, and "Hong Kong is looking to tourism to provide work for recent graduates and others" (China Daily, 2003, para. 14). Mainland China and Hong Kong signed an arrangement called Closer Economic Partnership Arrangement, or CEPA, in order to improve the economy of Hong Kong, along with reducing the unemployment rates. The partnership arrangement had three main purposes: "1) to reduce or eliminate the tariff or non-tariff barriers on all the trades in goods between the two sides; 2) progressively achieve liberalization of trade in services through reduction or elimination of substantially all discriminatory measures; 3) promote trade and investment facilitation" (Vice Minister of Commerce & Financial Secretary, 2003). The agreement helped the economy of Hong Kong, and the unemployment rates started to decrease.

The economy of Hong Kong recovered by the year 2005, as a consequence of the CEPA, and it has been improving ever since. The unemployment rates in the area of construction and manufacturing were the highest of all the sectors, but, thanks to the implementation of the CEPA, the unemployment rates in the wholesale, retail and import/export trades, restaurants and hotels

sectors decreased significantly. The unemployment rates declined in all sectors of economy; they fell to 5.5% in the year 2005. In November of 2006, Hong Kong experienced 4.4% unemployment while in March of 2007 the unemployment rate fell to 4.3%. Hong Kong is experiencing the lowest unemployment rates since mid-1998.

2.4.3 Job Market

The job market in Hong Kong is very different from the United States as well as other locations around the world. In this market wage labor is already an overflowing field, so many of the jobs that are being offered require more advanced skills and recognized forms of accreditation. The Government provides retraining services to the unemployed with low education levels through the Employees Retraining Board (ERB). Currently 38.5% of the new jobs are being filled by graduates from mainland China, and 38% are being filled by graduates from other countries (UHK, 2006, para. 5). So now, not only is the job market more competitive because of the workers already in Hong Kong, but now there are immigrant skilled workers to also compete against.

2.4.4 Average Wages

The government of Hong Kong imposes no minimum wage (HKCTU, 2002). Thus the wages that the fishermen earn in Hong Kong depend solely on the price of fish on the market and how many fish per day are caught. Estimates can be made about how much profit is made from each fish using websites listing wholesale market prices of fish in Hong Kong (Fish Marketing Organization, 2007). There are many factors, however, which this estimate does not take into account. These variables include: how many fish are brought in of each type, how many people the money is split among, what percentage of the market price goes to the fishermen, the cost of

fuel, and the cost of maintaining the boat. In conclusion, it is rather difficult to determine what standard of living an "average" fisherman is used to, however, it is known that the income is unlikely to be steady or reliable because it is directly proportional to the daily catch. This is why inquiries into average wages and profit are included during the surveys of the fishermen.

2.4.5 Interactive Employment Service

The Interactive Employment Service is an on-line survey which helps place job seekers into the proper employment fields. This service can be used by anyone who has a computer with Internet access and allows faster job placement. For example, a worker can input the wage they are seeking and also skills that they have and the service will notify them of all of the possible positions which they can interview for. Unfortunately this program is not widely used by the fishers' community. There are currently locations that are beginning to change that, which are located near some fishing ports in Hong Kong. These offices are complete re-employment offices which are able to help the unemployed use the Interactive Employment Service.

2.5 Training Programs in Hong Kong

Hong Kong has developed different kinds of training programs in order to educate their people and help them find new jobs. Some examples of these programs are the vocational training program and the taxi training program.

2.5.1 Vocational Training Program

One of the largest vocational training programs in Hong Kong is the Vocational Training Council (VTC) which was founded in 1982. The program offers "diversified pre-employment and in-service training to over 160 000 students and trainees each year" (Vocational training council [VTC], 1982).

The majority of the students are young people or employees who want to either find good jobs or improve their current business skills. Their mission is "to provide a valued choice of flexible progression pathways for school leavers and adult learners to acquire the values, skills and knowledge for lifelong learning and enhanced employability" (VTC, 1982).

2.5.2 Taxi Training Program

In the year 2000, a new taxi training program was created for new taxi drivers in order to improve the quality of the public transportation in Hong Kong. The program focuses on "customer service, basic Putonghua (Mandarin Chinese) and English communication skills, knowledge about destinations and routes, taxi regulations and Road Users Code as well as safe driving habits" ("Hong Kong launches taxi training program," 2000, para. 2). The program lasts 12.5 hours, and it is given in the form of lectures and peer discussions. DVD's, tapes, and CD's will be released to encourage a self-learning program in order to improve the drivers driving skills.

2.6 Job Placement Possibilities

There are currently jobs available in Hong Kong which are able to sustain the fishing population and are related to fishing and marine work. The two most prominent ones are shipping work and the pollution control unit.

2.6.1 Shipping Work

Hong Kong has a large shipping industry, which result directly from the city's position as a major global shipping port. More than 35 different shipping companies exist in this industry (Marine Department 2007a). Their function varies from the actual shipping, to loading and

unloading the boats, to repairing and assessing the boats.

A small market has sprung up in transferring items from the larger international boats to the actual docks on the harbor. Many of the international boats are too large for the shallow water of the harbor. This means that the cargo of the larger boats are frequently transferred to smaller boats for transportation over the final stretch of water before the land (Marine Department 2007d).

Another job related to the shipping work is as deck hands on these boats. Many of the fishing boats feature the same small cranes as the transfer boats. In this job the cranes are used to transfer cargo from the large international boats to the small harbor boats and from the harbor boats to the land (Marine Department 2007d).

The international shipping boats also require crew members. Employees would work on the boats as it sailed to around the world taking cargo from one port to another. Not all of the companies which hire for this job are based in Hong Kong or use Hong Kong as a central port (Marine Department 2007a).

Another source of work is servicing boats when they come in to harbor. At that time, many items must be cleaned, repaired, and otherwise cared for before the boat's next voyage. These items include the international shipping boats, local transfer boats, cranes, loading and unloading equipment, and other harbor hardware (Marine Department 2007b).

2.6.2 Pollution Control Unit

The Pollution Control Unit is responsible for many aspects of keeping the harbor clean for the safety of its inhabitants and the preservation of its wildlife. It annually collects approximately 16,000 tons of waste from the harbor water and surrounding land (Marine Department 2007c). Part of the responsibilities of the Pollution Control Unit include inspecting

vehicles and tanks that could release oil into the water (Marine Department 2007c).

A potential opportunity is for the fishers to work for the specialized fleet of rubbish collection vehicles that the Pollution Control Unit operates. Some of these boats are specially designed for rubbish collection (Marine Department 2007c). The cleaning boats, however, are approximately the same size as fishing boats. Other boats are listed as "contractors" and modified from existing boats (Marine Department 2007c).

Overall the Pollution Control Unit offers several options to fishers which are worth further analysis.

2.7 Types of Boats

Several types of boats are commonly used by the fishers. Photographs of all the following types can be found in Appendix M: Appendix of Boats. The smallest boats are fiberglass reinforced boats with an outboard motor. They are commonly referred to as P4/7 boats because of their government license (Rebuilding Hong Kong's Marine Fishery 2007) or a P4 for short. These boats generally act as a mode of transportation rather than a platform for actual fishing. They are used commonly as gill-netters but sometimes P4 boats are also used as a base for long-line fishing.

The next range is the mid-sized wooden boats. These boats are larger, made of wood, and in some cases also act as home to the family that owns them. They are commonly used as purse seiners but depending on what fishing equipment is purchased they can be outfitted for other purposes. They are also physically capable of all forms of fishing P4s can do.

Trawlers are the largest boats. They can be easily visually identified by the pair of poles coming up to a point over the stern which permits them to manipulate their trawling nets.

Depending on their configuration they may trawl for shrimp or for normal fish. Some trawlers work in pairs with a larger net held between them and share the catch.

A small population of fishers fish from their homes on the water. These floating homes are constructed mostly from wood with plastic gas tanks used to keep them afloat on the water. A small hut is generally featured in the middle of the raft with a deck surrounding it. Some areas of the deck are open to expose nets. Fishers collect crabs and other seafood items with a high market value from these nets.

2.8 World Wide Fund for Nature Previous Study

In 2007 the WWF commissioned a study evaluating the management options of Hong Kong's marine fisheries. This study has been valuable in finding a valid starting point for our team's study.

The study broke most of the conclusions down into three groups by boat type. The first group is referred to as the fiberglass covered motor boats with an outboard motor. Their legal boat license is called a P4/7 so the boats are often referred to by that name or simply as a P4. These boats generally target a small number of valuable seafood items such as crabs in order to gain the most money per item caught.

The second group of boats is referred to as a medium boat. The report references them under many names, such as mid-sized boat or wooden boats. They are also called purse seiners after their most common method of fishing.

Trawling boats are the third group. The report occasionally references them in two subgroups: shrimp trawlers and hang trawlers. This demographic included a large number of boats which were not making a profit or were just barely able to sustain their crews. Of the 50%

of fishers who claimed they could not sustain themselves or could barely sustain themselves, 58% of this population was from trawling boats. This is disproportionately high compared to the proportion of trawling boats to non-trawling boats.

Many important observations were made in the WWF report. The difficulty of fishing was remarked upon repeatedly. Most fishers reported a decrease in the fish stocks. They also complained of rising oil prices making the profit per day less. To combat this, most fishers fish every day that they are able.

Many complaints were cited about the influence of China on Hong Kong fishers. According to fishers the presence of mainland China poachers in Hong Kong waters makes competition more difficult. The AFCD hopes to begin a licensing system to increase the severity of the penalty for poaching in order to discourage poachers from entering. When the Hong Kong boats go to China to seek additional water they are hampered by the fact that in China the fishing boats use electricity to fish. This kills a tremendous number of fish, causes severe damage to the surrounding wildlife, and makes competition with these boats nearly impossible by conventional methods.

A large number of fishers were willing to switch jobs according to this survey. Approximately 54% of the fishers were willing to switch jobs. 53% of the fishers who claimed to be making a profit fishing were willing to switch, while 60% of those unable to make a profit were willing to switch.

The majority of the fishers were elderly. The largest population segment was between the ages of 50 and 60 years at 42% and the second largest segment was 40 to 50 years of age at 29% of the total population.

Fishers seemed eager to engage in a boat buy back system. They encouraged the passage

of such legislation and were interested in participating in such a program should it pass.

Support for Marine Parks is fairly widespread among fishers. Many fishers are comfortable with the concept of no trawling in the Marine Parks, however as a large number of fishers surveyed are not trawlers this is not particularly surprising. 86% of fishers agree with the concept of no fishing in the Marine Parks at all. 82% feel that current Marine Parks are not protected enough. 45% feel that they would be negatively impacted by marine parks which are no take zones.

The WWF examined many potential new employment opportunities for fishers. The WWF considered dive shops to be an excellent source of employment opportunities in this study. Dive shops felt that they would see an increase in business if there were more marine parks because they would attract more tourists. 55% of dive shops were willing to hire fishers to hold the new jobs which would be created. These fishers would perform jobs such as being the boat operators for dives or by being fishing guides for the tourists. Dive shops were reluctant to put fishers in other positions, citing poor skills in sales and customer relations. 73% of dive shops said they expected to provide training for the fishers themselves.

Unfortunately, some dive shops are also having a difficult financial time in the current economic situation. Poor visibility in Hong Kong waters is discouraging tourists from diving. Increasingly, tourists will only rent diving gear and not invest in a personal set. The dive shop owners see this as a form of lost revenue. Additionally, many divers only learn to dive in Hong Kong and spend most of their actual diving time elsewhere in the South China Sea. However, since the SARS incident has ended, tourism has been a steadily growing industry. This may outweigh these negative effects in the long term.

Changing from fishing to tourism poses many challenges. Renovating a fishing boat to

meet the standards required of a tourism boat is expensive. Additionally, leisure boat licenses require a written exam. Passing such an exam is a difficult task for the portion of the population which is illiterate.

Fishers in their current educational status believe themselves only good matches for maritime or low-income jobs. Unfortunately, an influx of mainland China immigrants has flooded the low-income market and made finding a job in these sectors difficult. Fishers are unlikely to find a higher-income job unless they learn a second language or learn to read. The study mostly expects the new employers of the fishers to provide any required training themselves.

An additional concept is to move the fishing into off-shore areas where the stock is not as endangered. This is not a livelihood change per say as the fishers are still fishing but it requires a lifestyle change for the fishers. The AFCD has many options assisting fishers in moving out into deeper water. However, the AFCD says that most boats which have the possibility to fish farther out are already doing so because of the increased catch potential.

2.9 Conclusion

After reviewing the problems of over-fishing around the world and the different re-education methods for fishermen, we have come to several conclusions. Over-fishing is a large-scale problem that has had devastating effects on many communities around the world. There is no simple solution to help alleviate this problem, including removing the excess fishermen from the industry. Different re-education programs show potential for effectiveness in Hong Kong depending on the required skills needed to complete the programs. Another possible option for some of the fishermen is the tourism industry that seems to be expanding with options in marine

tourism. From our initial research, including the options to re-educate or re-employ the fishermen, we have determined that there may be no successful way of removing fishermen from the industry and no alternative livelihoods.

3.0 Methodology

In order to determine alternative livelihoods for the fishermen, there is a series of objectives that we met. First, we identified the skills and the levels of formal education currently possessed by fishermen in Hong Kong by surveying them. Secondly, we identified government programs and resources that are available for the fishing population of Hong Kong through interviews we conducted with experts from the field and government officials. Our third objective was to identify potential jobs that would be accessible to fishermen based on their current skills and education through interviews with potential employers and based on the results of the surveys. This chapter outlines the methods we used to achieve our objectives and ultimately our project goal.

3.1 Survey of fishermen

The survey of fishermen was conducted because it was the easiest and most efficient way to gain basic information such as age and formal education levels of the fishermen from a large population sample. Through the survey, we were able to gain a sense of the fishermen's perceived ability to transfer from fishing to different careers as well as their thoughts on potential alternative livelihoods. All of the questions included in our survey were based on the old World Wide Fund for Nature survey conducted in 2007 and on other suggestions made by the WWF. Before administering our survey, a student from the Hong Kong University of Science and Technology translated our survey into Cantonese. Once the survey was in Cantonese, we tested it by distributing it to the fishermen in Shau Kei Wan harbor. Based on the results from this test, we realized that we needed to add two more questions to our survey in order to make it more effective. Once we added these questions, we came up with the final version of our survey (see

Appendix C) that was then distributed in Aberdeen, Lamma Island, Cheung Chau, Tai Po, Ap Lei Chau and Sai Kung harbors. In order for us to interact with the fishermen and distribute our survey, we rented two junk boats for one hour. We found that it was more efficient to divide our team into two groups; each group would rent a different junk boat at the same time. The junk boats drove us from boat to boat where we had our translators ask the questions to the fishermen once we stepped onto their boats. Once the survey was completed, we were able to analyze the responses and look at trends including average age, willingness to attend re-training programs, and amount of income within the fishing population. The survey was useful in identifying specific information about the entire fishing population to help meet our objective of determining the skill levels of the fishermen. In addition to the surveys with the fishermen, we also conducted two interviews with fishing families which can be found in appendices I and J. One of these families was made up of current fishermen and the other one was a family of fishermen who had already made the transition to an alternative livelihood.

3.2 Interviews with government officials

We interviewed Dr. Yiu Ming Mak, the Fisheries Officer in charge of training and development from the Agricultural, Fisheries, and Conservation Department (AFCD) and exchanged correspondence with the Labor Department in order to determine any previous attempts or future programs initiated by the government to help the fishing population transition into their new livelihoods (see appendices E and H). In order to find solutions to our project's problem and find career alternatives for fishermen within Hong Kong, we needed to determine the perspective of the government to solve the issue of overpopulation of fishers.

3.3 Interview with Marine Biologist

We interviewed Professor Ang Put, a marine biologist from the Chinese University of

Hong Kong, in order to determine the feasibility of seaweed and algae farming as well as the viability of mariculture in Hong Kong (see appendix F). Both seaweed and algae farming as well as mariculture were considered as potential career alternatives for the fishermen in Hong Kong.

3.4 Interview with potential employers

Interviews with potential employers, that can provide jobs designed to fit the fishermen's skills, helped the team understand what types of jobs would be appropriate for the fishermen. The team used these interviews to determine the skills that are necessary to be successful in the jobs and assessed the ease of transition based on these needs. These interviews were conducted after the team completed the survey of fishermen so that the fishermen could be matched to potential fields with minimal training, expense and effort. We conducted an interview with the Star Ferry Company since they were considered as a potential employer (see appendix G).

3.5 Conclusion

Our methods of analysis helped the team identify viable possible solutions to the problem of the overpopulation of the fishing industry. Once the data collection and analysis was complete, we developed a better understanding of the possibilities for re-employment of fishermen in Hong Kong. We were able to identify the viability of different alternative livelihood options for fishermen and meet our project goal.

4.0 Data

This chapter describes the data collected from surveys with fishermen and interviews with experts. The surveys from the fishermen gave valuable insight into potential alternative livelihoods. Combined with the interviews from experts, the surveys provided useful data in determining potential careers.

4.1 Interviews

Several interviews were conducted with government officials, potential employers, and experts from within the fishing industry in order to gain valuable information about potential alternative jobs for the fishermen and their feasibility in Hong Kong.

4.1.1 Interview with Dr. Mak

Dr. Yiu Ming Mak is the Fisheries Officer of the Agriculture, Fisheries, and Conservation Department and is responsible for all training and management within the fishing industry. The main topics that were covered in our interview with Dr. Mak were fishing legislation, tourism vessels, and seaweed and algae farming.

Dr. Mak explained that the fishing population is divided into two groups, capture fishermen and cultivation fishermen. The laws governing each type of fishing are different. Cultivation fishers, or “fish farmers”, grow the fish in a small, controlled area and then harvest them much like a crop. Capture fishers go out into the sea and catch wild fish. Capture fishers are the ones of concern in this study since they are the ones catching the wild fish.

One of the largest problems facing the fishing industry is the lack of government legislation to protect the rights of the fishermen and regulate the amount of fishing. Currently, there is no licensing system in place for the capture fishermen of Hong Kong. With the lack of

legislation, foreign fishermen cause many problems for the fishermen of Hong Kong. The outside fishermen are told to leave when caught in Hong Kong waters by the marine patrol but because of the lack of legislation, marine patrol can not take any legal action against the foreign fishermen. Dr. Mak proposed the idea of a fishing license system as a way to regulate the amount of fishing and record the number of fishermen.

While some people believe that operating tourism vessels would be one of the easiest career changes for the fishermen and could prove to be a viable livelihood, there are many reasons why careers within the tourism industry may not work. Since most of the tourists that come to Hong Kong are English speaking, any fishermen that would transfer to the tourism industry would need to speak some English. Currently, none of the fishermen speak English and they are very reluctant to learn. Another potential tourism career would be to allow tourists to go out fishing with the fishermen on the boats. However, this concept is infeasible because of the high safety regulations of the government.

Seaweed and algae farming offer limited re-employment opportunities. The seaweed that is most commonly eaten by local people in Hong Kong grows wild along the shores during the winter. Fishermen already gather this seaweed and sell it in the local markets. Algae have never been grown because algae can also be harvested in the wild. Another concern with seaweed and algae farming is the temperature change. The hot summer weather within Hong Kong kills all forms of seaweed and algae that grows in the winter.

4.1.2 Interview with Professor Put

Professor Ang Put is a marine biologist in the Chinese University of Hong Kong. The main topics that were covered in our interview with this professor are the feasibility of seaweed farming, the viability of mariculture, and the importance of the “no take zones” in Hong Kong.

Professor Put said that seaweed farming is not economically feasible in Hong Kong for many reasons. First of all, Hong Kong would have to compete against mainland China, which is the biggest producer of seaweed in the area but Hong Kong could never produce as much seaweed due to its small size. Another reason why seaweed can not be farmed in Hong Kong is because of Hong Kong's land problems. There is not enough space to farm the seaweed and, the few land spaces that do exist in Hong Kong, are too expensive. Also, professor Put explained that "economically feasible species" would have to be farmed. An example of "economically feasible specie" is the Irish moss, but this specie is not native of Hong Kong so it is not possible to farm it.

Professor Put commented that mariculture in Hong Kong is not land-based; the fish farmers breed the fish in cages within the ocean. Many fish can not survive in the cages that they are farmed in. In order to make the mariculture economically viable, only very expensive fish can be farmed so that the profit will be worthwhile. He believes that mariculture could be an alternative career for the fishermen but only if it is economically feasible for them. Since it is a very expensive business, it could be hard for the fishermen to make enough profit out of mariculture. Realistically, mariculture is not a viable option for fishermen since it is really hard to make profit out of mariculture; it is not guaranteed that the fishermen will make a decent living out of it.

During our interview with Professor Put, we also discussed the importance of the protected areas and no-take zones within Hong Kong waters. He explained that, in theory, having protected zones is a good idea but they might not be practical. In theory, if some areas of Hong Kong are protected, the fish will re-grow but it is not guaranteed that they will, in fact, re-grow. He believes that it is too late for having protected areas because the fish populations of

certain species are already extinct.

4.1.3 Labour Department Programs

In order to gain an understanding of current programs and options for the fishermen to identify jobs that will match the needs of the fishermen, we exchanged correspondence with the Labour Department.

The labour department provided us with information about the Employment Programme for the Middle-aged, a program for people over forty, and about the amount of money allocated for re-training programmes. The Employment Programme for the Middle-aged is geared to assisting middle-aged job seekers in securing sustainable employment through employment assistance and on-the-job training. Employers who hire a job-seeker who is 40 or above in full-time permanent posts and offer him or her training receive a subsidy for training expenses of \$1,500 per month, for up to three months.

4.1.4 Interviews with Potential Employers

To identify jobs that correspond to the desires of the fishermen and to identify the skills that fishermen may need, we exchanged correspondence with the potential employer Star Ferry. Star Ferry could be a viable potential employer of fishermen because many of its jobs do not require any additional skills. There are positions within the Star Ferry Company in which employees do not need to speak English or interact with customers. The ferry or pier crews have jobs that many of the fishermen could perform. Star Ferry currently employs 324 employees and about forty ferry crew members are ex-fishermen. Star Ferry uses an internal promotion system so that any fishermen that would be hired would start as Ferry Sailors and could be promoted to higher positions such as Coxswain or Ferry Engineer. There is also a series of on-the-job

training programs that Star Ferry offers to its employees. Unfortunately, there are several reasons why the Star Ferry will not be a potential employer for the fishermen. Any applicants that apply to Star Ferry need to be able to write and read Chinese. Also, the Star Ferry is not currently hiring and does not plan on expanding its workforce in the future so there are no job openings for the fishermen.

4.2 Surveys of Fishermen

A survey was conducted of 54 fishermen from seven of Hong Kong's main ports – Aberdeen (5), Ap Lei Chau (5), Tai Po (10), Shau Kei Wan (11), Sai Kung (10), Cheung Chau (11) and Lamma Island (2). The survey, included in Appendix C, explored the fishermen's ability to speak English, their mode of fishing, their age, willingness to attend retraining programs, their monthly gross income as well as anecdotal evidence that we gathered through our interactions with the fishers. As described in Appendix M, there was a wide variety of different boats surveyed, ranging from larger trawling boats to small P4 boats.

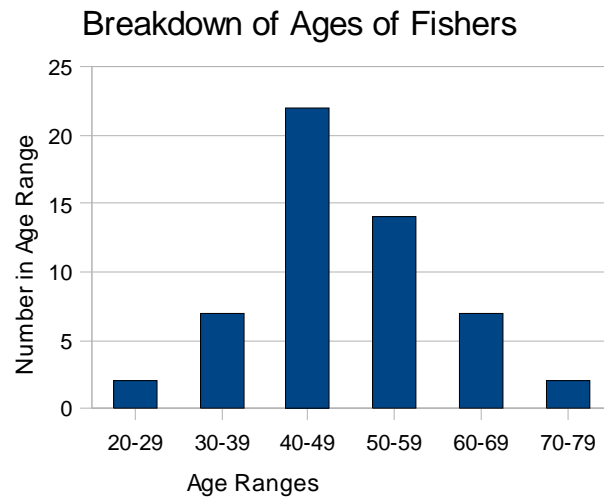


Figure 1 Age Graph of Fishermen

As shown in Figure 1, the majority of fishermen are middle-aged and the average age of the fishermen surveyed is 43.7. Ninety-one percent of the fishermen have seen a decrease in the number of fish over the last few years and seventy-six percent acknowledged that there should be more zones of protection for the fish. Many of the fishermen described the problems that they were facing in the industry and several even showed us the small amount of catch they gathered after a full day's work. Several other fishermen discussed the unlikelihood of anyone entering the industry because of the worsened conditions. If there are no people that join the industry, the fishermen will continue to age and as time goes by the fishing population will be naturally reduced.

Interest in English Lessons by Age Group

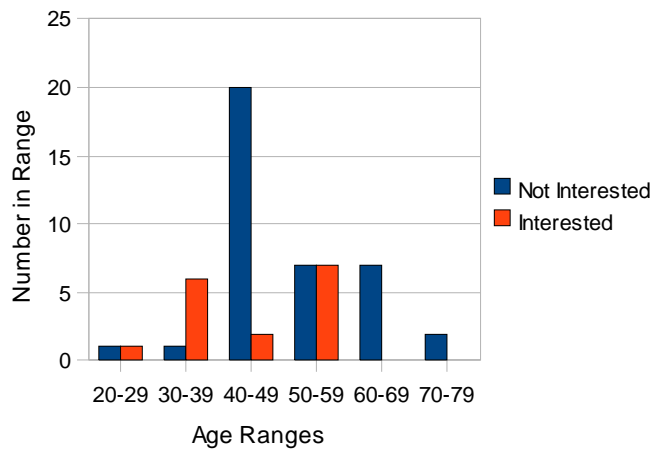


Figure 2 English Learning

None of the fishing population speaks English and less than a third of the fishermen surveyed are willing to learn or attend language classes. As shown in Figure 2, only 17 of the 54 fishers surveyed (30%) are interested in learning English, but these are concentrated in two age cohorts, between 30-40 and 50-60. Six of the seven fishermen who are between 30 and 40, 85% of that age group and 11% of the entire sample, are interested in learning English. Of the 14 aged 50-60, seven (50%) are interested in learning English. Among the 17 fishermen interested in learning English, the majority (41%) agreed that 8-10pm would be the best time for classes to be held. Another four of the fishermen who had expressed interest in learning English went on to explain that they did not have time to do so. Many of the fishermen are out at sea from before sun rise until late in the evening in order to catch the most fish. When they do come back into the ports, they are busy performing boat maintenance and preparing the fish they catch. Also, many do not fish at the same time every day because of changes in the tide and the weather.

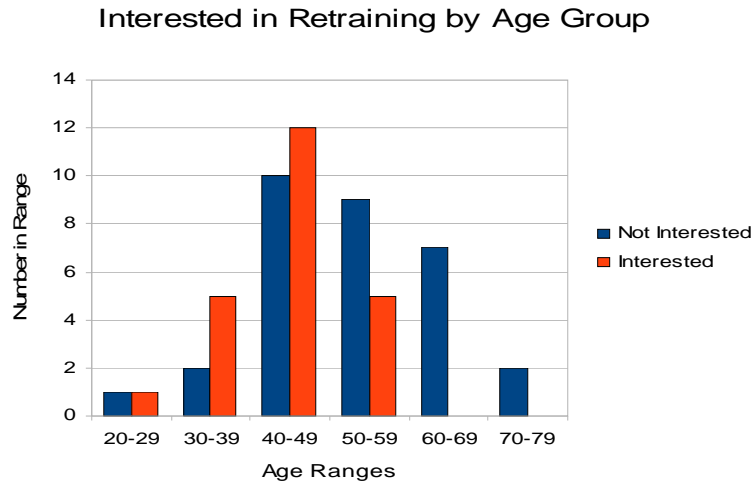


Figure 3 Retraining Interest

Many of the younger fishermen are also willing to attend retraining programs to change careers. Of the 54 fishermen surveyed, 23 (42%) would be willing to attend retraining programs shown by Figure 3. Six of the nine fishermen in their twenties and thirties are willing to attend retraining programs. Seventeen of the 36 fishermen between the ages of 40-60, 47% of that sample and 31% of the entire sample are willing to attend retraining programs. Of the 23 fishermen willing to attend retraining programs, 11 of them (48%) would be available to attend programs between the hours of 8 and 10 pm.

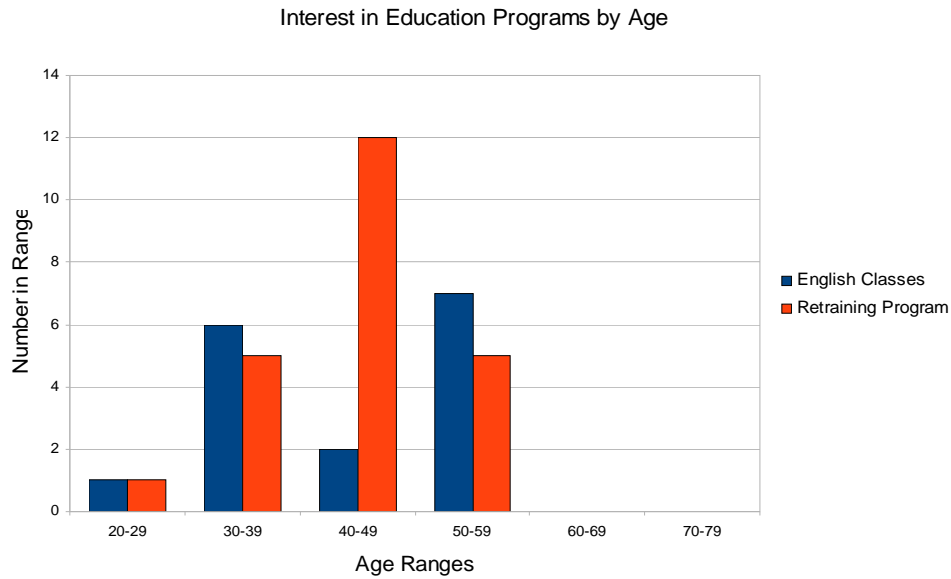


Figure 4 Interest in English Courses and Re-training Programs

As seen in Figure 4, the age distributions of the fishermen that are interested in learning English and are willing to attend retraining programs shows that the younger fishermen will be best suited for re-employment opportunities. From the data collected, it is shown that the older section of the population is unwilling to attend English classes or be retrained. Many of the older fishermen that we surveyed expressed a concern for being “too old” to be re-employed or re-trained and would prefer to remain fishing.

The majority of fishermen that we interviewed (93%) owned their own boats. Along with owning their own boat comes the knowledge of crewing and maintaining a boat which will hopefully ease transition into other careers.

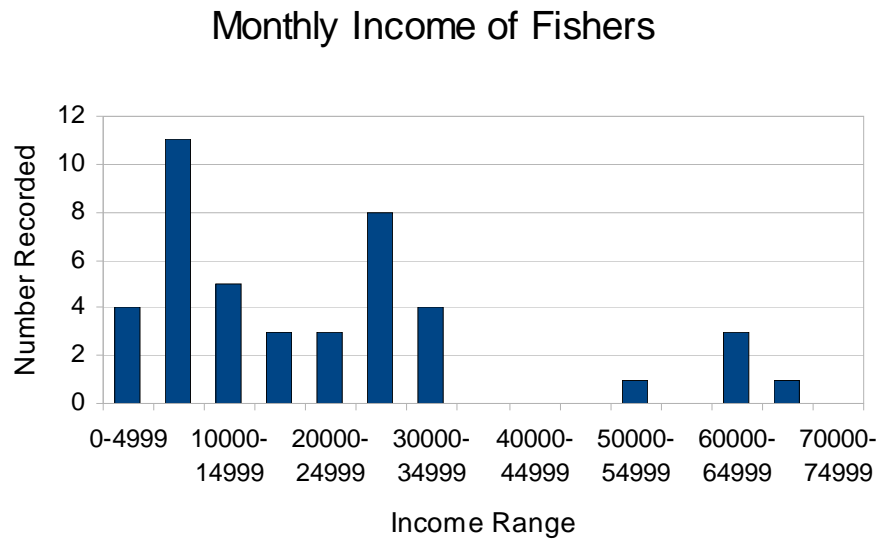


Figure 5 Monthly Gross Income

The current gross income of the fishermen is an important factor in identifying appropriate jobs for the fishermen. Eleven of the fishermen surveyed (20%) did not want to give us an exact figure. Of those that answered, the income ranged from \$1,000HK to \$65,000HK per month which is shown in Figure 5. As seen above, the income distribution is bimodal. The higher incomes are representative of the larger trawling boats that have a higher gross income. The lower figures make up the gross income from the different types of smaller boats.

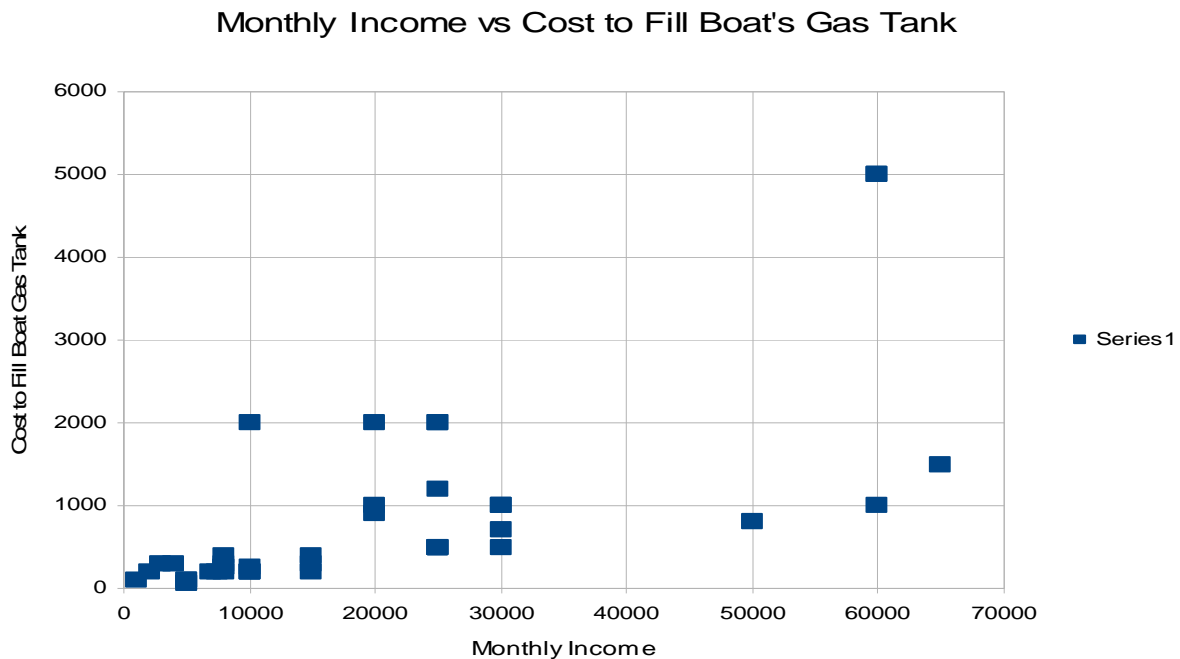


Figure 6 Fill Cost vs. Income

Figure 6 displays the monthly gross income of the fishers against the cost to fill the boat with fuel. As not all fishers responded to the question asking what type of boat they own or instead responded with what variety of fishing equipment they use, this chart reveals a second insight into the different types of boats on the harbor as similar types of boats require similar amounts of fuel. Charted against monthly gross income, this graph helps us determine which varieties of boats bring the greatest profit to their owners. The results indicate that while there is a correlation between boat type and income in some demographics, there are other factors involved. Trawlers comprise most of the points with the greatest fuel costs per filling. How much gross income they create for their owners varies tremendously. This is not surprising as some trawlers trawl in pairs with a net between them and split the catch. These pair trawlers are likely to not have to fill their tanks with gas as often because of the fuel efficiency of using two boats to drag a net over using one boat to pull the net. This explains why while a single tank

filling may cost the same for a pair trawler compared to a shrimp trawler, a lower level of gross income is still acceptable. The trawlers with cheaper filling costs overlap with the larger mid-sized wooden boats in fuel costs. Profit varies here also. Small P4 boats have fairly uniform low costs to fill and tend to have similar low gross incomes.

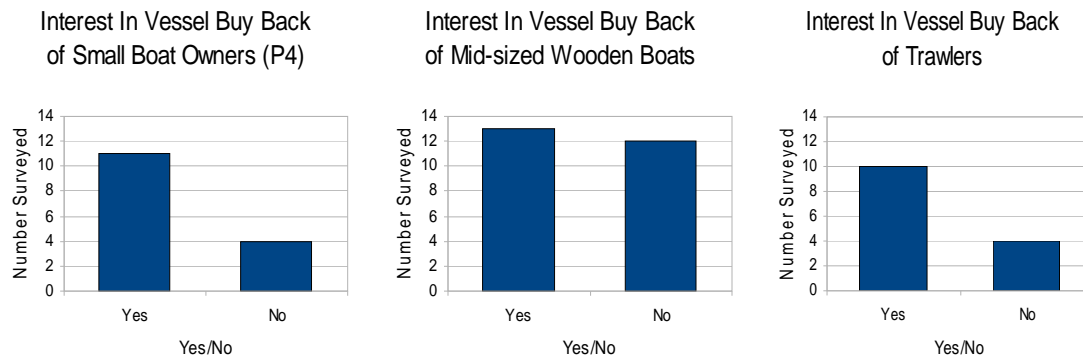


Figure 7 Willingness to Participate in Vessel Buy Back Program based on Boat Size

As seen in the graphs of Figure 7, there is a varying amount of interest in the proposed Vessel Buy Back program when divided by size of the boats. The majority of large trawling boat owners (71%) as well as the majority of smaller P4 boat owners (73%) expressed an interest in participating in the program. The results from the data of the middle-sized boat owners is more evenly divided showing only 52% interested in the Vessel Buy Back program. Overall, 70% of the fishermen surveyed are willing to participate in the program.

4.3 Informal Observations

Throughout the time we spent with the fishermen while conducting surveys, we made many informal observations. These observations allowed us to gain a much better understanding of the lifestyles and behaviors of the fishermen. Many of the fishermen were eager to talk to us about a wide variety of topics. As foreign university students, we seemed to possess a certain

appeal and were well-received by the fishermen. This allowed us to gain access into the fishermen's lives that the WWF wouldn't normally have gotten. Many of the fishermen wanted to show exactly how little they caught over the course of a day. One fisherman, in the particularly poor region of Tai Po, took a small container of fish out from where he had been refrigerating them to show us the meager results of the entire previous day of fishing. Another interesting observation we made was evidence of pride in the fishing families and in particular, the children. After completing a survey in the port of Shau Kei Wan, one of the fishermen went into his boat and returned with his young daughter. He had her translate several basic sentences for us to show her English skills. During our time at Cheung Chau, a fishing couple that we surveyed talked at length about how they had worked hard and saved for years in order to send their daughter through school in Australia. After observing these findings, our team gained additional insight into the livelihoods of the fishermen and their opinions about many of the issues facing the fishing industry.

5.0 Analysis

The surveys of fishermen and the observations of experts in government, academia, and the maritime industry together suggest opportunities and limits for reemployment as a strategy for reducing the number of active fishermen.

5.1 Re-employment

Re-employing the fishermen proves to be almost impossible. All the options researched prove to be infeasible for different reasons. Options range from aquaculture and mariculture to employment with the ferry services.

5.1.1 Seaweed Farming & Mariculture

Both seaweed farming and mariculture do not seem viable careers for Hong Kong fishermen based on the interviews with Dr. Mak and Professor Put. Seaweed farming depends on the weather; it grows better during the cold winter months. The hot summer of Hong Kong would kill all the seaweed grown in the winter. Dr. Mak stated that the temperature changes of Hong Kong make seaweed farming almost impossible. Also, seaweed farming is economically infeasible in Hong Kong because there is limited space available and because there are no “economically feasible species” existing in Hong Kong. Professor Ang Put stated that the Irish moss is a feasible species but because it is not native of Hong Kong, it can not be farmed in Hong Kong.

Similar analysis to that of the seaweed farming can be drawn from the idea of having fishermen work in mariculture. The mariculture would only be feasible if an economically

sustainable fish could be used. Professor Put said that, realistically, mariculture is not a feasible option for fishermen because it is a very expensive business since only expensive fish can be farmed in mariculture. It would be hard for fishermen to make profit out of mariculture so they are not going to be willing to change their fishing career to mariculture.

5.1.2 Star Ferry

The fishermen who are able to read and write Mandarin could be employed by Star Ferry as Ferry Sailors. Star Ferry stated that fishermen are welcome to apply for jobs in their Company but that they would probably not get hired because they are not planning on expanding their crew establishment.

5.1.3 Shipping Work

Many jobs are created by Hong Kong's position as a major fishing port. The fishermen already possess many of the skills that are involved in the shipping jobs. Fishermen could pilot the small boats which transfer goods from the large boats to shore. These boats are relatively the same size as the fishing boats the fishers are accustomed to using and would therefore be an easy adaptation for the fishermen. Another job opportunity available within the shipping industry is work as deck hands. Many of the fishing boats have the same equipment as the transfer boats so the fishermen already have the required experience. It is also feasible for the fishermen to work maintaining and repairing marine vehicles and tools since the fishermen have gained fairly extensive experience in caring for their own ships and equipment.

As these options may be viable for the fishermen, most of the shipping companies still require their employees to undergo training courses and the majority of fishermen are not willing to attend training courses.

5.1.4 Pollution Control Unit

The Pollution Control Unit is funded by the Marine Department of the Government of Hong Kong and works to keep the harbor clean. The responsibilities of the Pollution Control Unit include inspecting vehicles and tanks that could release oil into the water. Fishermen are accustomed to inspecting and repairing the hulls of their personal fishing boats. However, the fishermen would still require training to meet the Pollution Control Unit's standards. Another opportunity is for the fishermen to work for the specialized fleet of rubbish collection vehicles operated by the Pollution Control Unit. The cleaning boats are approximately the same size and this transition should be relatively easy for the fishers. Unfortunately, this job is only viable for a small number of fishers. While many fishers are well-suited to a job on the Pollution Control Unit, the department is relatively small and the number of openings is not sufficient to employ a large percentage of fishers.

5.2 Re-training

Re-employing the fishermen can require additional skills through English classes or re-training programs. The fishermen have basic skills related to boating but many of the alternative careers involve more specific or detailed skills that would require some sort of training program. The surveys of the fishermen prove that re-training the older population of fishermen is not an option since none of them are willing to get re-trained for other jobs. The older fishermen explained that they are too old to get hired anywhere else; hence, it is not worth it for them to get re-trained. It is almost impossible to re-train a fairly old population of fishers. On the other hand, younger fishermen are more willing to get re-trained and educated for new careers since they believe that young people have more career opportunities.

5.2.1 English Courses

One of the most useful re-training options for the younger fishermen would be an English training program designed to teach them basic English. Since it has been shown that young fishers prefer courses taught at night, the best time for the English courses would be between 8 and 10 pm. This time would allow the fishermen to continue their current fishing careers while they could learn English in their off-time and then maybe find a new career afterwards.

5.3 Effectiveness of Government Re-Employment Programs

The government initiated the Employment Programme for the Middle-aged to help people over 40 years old find a job. Unfortunately, this program is not effective for fishermen since it is not targeted to their needs in regards to the time of the year and day that suit the needs of the fishermen. If the program is changed to suit the needs of a less educated population then the fishermen would be more willing to use it.

5.4 Comparison of Results to Previous WWF Study

There were many interesting correlations and discrepancies between the former study conducted by the WWF and our project. This section identifies such similarities and explains the differences.

5.4.1 Trawlers

The situation of the trawlers was reported to be different in each study. In the 2007 study, trawlers were one of the boats that had the hardest time making profit. In contrast, trawlers were found to be one of the most profitable classes of boats in this study. This difference could arise because the surveys were conducted during different times of the year. During the 2007 study

the surveys were conducted in July. Our team's surveys were conducted in January, particularly near the Chinese New Year. During the Chinese New Year, the trawlers that fish farther out on the South China Sea come back to their home port so that the fishers can spend the holidays with their extended families. In July, restrictions are placed on fishing in Hong Kong to permit fish stocks to re-grow. This motivates the trawling boats to get out of Hong Kong for that period of time. This hypothesis is supported by the abnormally large number of trawlers who reported that they fish mainly outside of Hong Kong. Only 25% of the trawling boats interviewed in the previous study were local to Hong Kong. The other 75% listed places such as the South China Sea, Taiwan, and Mainland China. The South China Sea was by far the most popular destination and the fishing grounds of 77% of these off-shore fishers.

These results are highly significant as the Agriculture, Fisheries and Conservation Department (AFCD) has a program to assist fishers in moving from near-shore to off-shore fishing. If more trawling boats are presented with it this data and the AFCD's opportunity it might motivate them to autonomously move into deeper waters in the hopes of greater profit. This would be beneficial to re balancing the environment of Hong Kong as trawling is one of the most environmentally damaging fishing practices.

5.4.2 Transitioning to New Careers

Both surveys showed a strong willingness to change careers if the new career would offer the same pay. In the 2007 survey this caused 54% to say they would. In our survey this number was closer to 48%. This difference may stem from the same population differences that made our data on trawlers different. The off-shore trawlers are not willing to switch careers because they are making a solid profit.

5.4.3 Age Distribution

The population ages are somehow similar in both studies, but not quite the same. Our survey has more people between the ages of 40-50 than 50-60, the opposite of the 2007 survey. However, these two age groups remain the largest population segments in both surveys. The 2007 survey had a larger number of people in the 70-80 range and less people in the 60-70 range compared to our survey, but the youngest two segments are nearly identical. These differences are small enough that it is reasonable to believe they stem from the population sample size rather than an actual change in the demographic.

5.4.4 Other Similar Observations

In both studies, fishermen had similar opinions. Most fishermen reported a decrease in fish stocks and complained about the high oil costs. Also, the vessel buy back program seemed very well accepted by most of the fishermen. They also both cited the difficulties of moving from fishing to tourism.

5.5 Conclusion

Based on interviews and surveys, the team has developed a list of alternative livelihoods for the fishermen. These include mariculture, seaweed and algae farming, the tourism industry, ferry services and harbor cleanup methods. Seaweed and algae farming and mariculture are non-viable alternative livelihoods for fishermen because of different reasons listed above. Star Ferry positions are a possible alternative livelihood but there is a really low probability that the fishermen will get hired since Star Ferry is not planning on expanding their crew establishment. The tourism industry is an infeasible option for fishermen because fishermen can not speak

English and are not willing to attend English courses.

6.0 Conclusions and Recommendations

After interviewing Hong Kong fishermen and evaluating the requirements for several re-employment possibilities, we have developed a set of conclusions and recommendations with respect to potential opportunities.

6.1 Potential Re-employment Opportunities

Several alternative livelihoods were considered. As a result of our research, we have determined that none of the alternative occupations we investigated were feasible. The following is a description of the potential re-employment opportunities that we considered.

6.1.1 Seaweed and Algae Farming

Seaweed and algae farming are forms of aquaculture that have been successful in other parts of the world. However, there are many reasons why seaweed and algae farming are not feasible career alternatives for the fishermen of Hong Kong. As mentioned during the interviews conducted (see Appendices E and F), the lack of available space within Hong Kong waters to farm seaweed or algae makes this a very infeasible option. In addition, land and labor costs are so expensive that algae and seaweed farming are not economically viable. Since there are many other producers of seaweed and algae within Asia, it would also be difficult for farmers within Hong Kong to compete and be profitable.

6.1.2 Ferry Industry Positions

Based on the boating skills that could be carried over from fishing, positions in the ferry industry could be a viable career alternative for some fishermen. However, many fishermen would not be eligible for positions within the ferry industry because employees of the Star Ferry

need to be able to read and write Chinese and many of the fishermen are not able to do so. The possibility of fishermen getting hired by Star Ferry is very low since they have had the same crew establishment for the past few years and are not planning on expanding the company in the near future.

6.1.3 Pollution Control Unit

The Pollution Control Unit is an organization established by the Hong Kong government to eliminate pollution and trash within the harbor. The boat skills that the fishermen already possess would qualify them to work in the pollution control unit. The skills required to maneuver a garbage cleaning boat and a fishing boat are similar and fishermen are already competent in caring for boats. Unfortunately, the fleet hired by the Pollution Control Unit is small. This means the Pollution Control Unit would be a viable alternative career but only for a small number of fishers.

6.1.4 Mariculture

As described in the analysis chapter, there is a small probability that fish farming would work as an alternative career for fishermen. First of all, the cost of operating fish farms on land is too high. Many of the farmed fish are killed during the farming. Therefore, the industry would only be viable if an expensive fish is farmed so that enough profit would be made. Also, the only fish that would be able to sustain this business would have to be imported and are very difficult to farm. This only leaves the chance to farm less expensive species of fish in the waters which surround Hong Kong. Given the expenses associated with this business, the fishermen would not be able to adapt well or make a sustainable income. Another reason why mariculture would not work is because the government does not want to issue any more mariculture licenses.

6.1.5 Tourism

While there are jobs that could be made available for the fishermen within the tourism industry, they do not possess the skills necessary to work in this field. Almost all of these jobs would require the fishermen to learn additional languages like Mandarin or English. Unfortunately, our data shows that most fishermen are not willing to attend language classes and therefore very few would be able to work in the tourism industry.

6.2 Conclusions on Government Programs

After studying the programs that have been created by the government for re-employment, the team has concluded that there are no adequate employment programs that can be used by fishermen.

6.2.1 Interactive Employment Service

The Interactive Employment Service is a potential resource for the fishermen to use to seek re-employment opportunities. This would allow fishermen to be able to find careers with similar income as well as careers that allow the use of skills they already possess. Unfortunately, the Interactive Employment Service is very inaccessible to fishers due to scheduling conflicts and is therefore not a viable program.

6.2.2 Employment Programme for the Middle-aged

The Employment Programme for the Middle-aged is geared to assisting the middle-aged job seekers in securing sustainable employment through employment assistance and on-the-job training. Due to the lack of skills that the fishermen possess and their unwillingness to be re-

employed in other careers, the Employment Programme for the Middle-aged is not effective for fishermen.

6.3 Conclusions on Lifestyle of Fishers

After interacting with many fishermen, we were able to determine some of their views and beliefs that gave us insight into their lifestyle. The fishermen talked openly with us about a variety of topics.

6.3.1 Children of Fishers

Many of the fishermen are adamant about keeping their children from entering the fishing industry. The fishermen are well aware of the over-fishing problem in Hong Kong; fishermen know that their children would not make an adequate living out of fishing. Additionally, fishermen are encouraging their family and children to get the necessary education in order to find a different and better career. One of the fishermen talked at length about how he had saved for years in order to send his children abroad for school. Others made sure to have their children recite the English phrases that they had learned.

6.3.2 Aging of Fishing Population

Due to the need to sustain themselves and their families, many fishermen continue to fish past the age of normal retirement. Since many people realize that there is no longer a future in fishing, there are not many young fishermen or people that are joining the industry. The majority of the fishermen that had the means to get out of the industry on their own have already done so like the ex-fishing family that we interviewed (see Appendix J). Unfortunately, the majority of

fishermen that are left are beyond the age of transferring careers because they believe that they are too old to do so. As the elder fishermen continue to age, the fishing population should decrease. Therefore in 10 or 20 years, the fishing industry will have naturally decreased because many of today's fishermen will have stopped fishing.

6.3.3 Willingness of Younger Fishers

The data from the surveys shows that the most promising of the population to re-train in new careers were the younger fishermen. This is because they are more likely to be willing to change careers and to learn English. Along with skill level, the ability to speak English is an important factor for the fishermen when looking into potential careers. Along with their willingness to learn, the younger fishermen are able to work in jobs that are more labor intensive, thus further expanding the career options. Unfortunately, the younger fishermen only represent a small portion of the fishing population so not much change will be made by re-employing them.

6.4 Recommendations

Based on these conclusions, the team makes the following recommendations to the WWF.

6.4.1 Alternative Livelihood Options

After research into many alternative livelihood options, the team has come to the conclusion that none of the ones we examined are viable. Based on our research, we would recommend a shift in focus away from re-employment possibilities. In place of re-employment, there are several other measures that can be considered to reduce the fishing population. Two such measures are described below.

6.4.2 Development of New Programs

After performing research on the existing re-employment programs, the team has developed the recommendation of creating a program designed for fishers. As many of the fishermen are not willing to be re-employed and the population is aging, it would be more beneficial for the government to create a retirement aid program. If designed properly, this could help ease the fishermen out of the fishing industry and into retirement. The best option may be to wait for the old generation of fishermen to be naturally reduced. Since the majority of the current fishermen are old, the fishing population will most likely disappear by itself in the near future.

6.4.3 Shift Focus to Next Generation

One of the most beneficial options would be to focus efforts on the education of the younger fishermen and their children so that they are able to choose alternative careers to fishing. Giving the next generation a strong formal education means they will find jobs with a higher standard of living than fishing. Therefore, the population of fishers can be effectively decreased over time by moving the younger portion of existing fishers into other jobs and by assisting in providing a strong education for the next generation.

References

Almeida, Ana, and Cristovam, Maria Luisa. (2001). *Social partners sign pact on employment, the labour market, education and training*. Retrieved 11/17/07, 2007, from <http://www.eurofound.europa.eu/eiro/2001/02/feature/pt0102134f.htm>

Apostolopoulos, Y., & Gayle, D. J. (2002). *Island tourism and sustainable development: Caribbean, Pacific, and Mediterranean experiences* Praeger/Greenwood. from http://books.google.com/bookshl=en&lr=&id=uruoebh6vvsC&oi=fnd&pg=PA93&dq=ja maica+expanding+marine+tourism&ots=U791h3RN-L&sig=sTaO5VLpGO_wJLonfCYaXBaowqM#PPP1,M1

Bartlett, D. (2007, Thursday, 7 November, 2002, 14:03 GMT). South African fish fight goes to court. *BBC News*.

China Daily. (2003). *Hong Kong unemployment hits new record*. Retrieved 11/14/2007, 2007, from http://www.chinadaily.com.cn/en/doc/2003-08/19/content_256020.htm

Chow, N. W., & Chou, K. (2005). *To retire or not to retire: Is there an option for older workers in Hong Kong?* 39(2), 233. Retrieved 12/02/2007, 2007, from <http://www.blackwell-synergy.com/doi/pdf/10.1111/j.1467-9515.2005.00437.x>

Chui, S., & Ngan, R. (1999). Employment of Chinese older workers in Hong Kong: Cultural

- myths, discrimination and opportunities. *Ageing International*, 25(3), 14-30.
- Clayton, Mark. (2006). *Algae — like a breath mint for smokestacks*. Retrieved December 1st, 2007, from http://www.usatoday.com/tech/science/2006-01-10-algae-powerplants_x.htm
- CNN. (2000). *Researchers try to combine catfish, algae farming*. Retrieved November 16th, 2007, from <http://archives.cnn.com/2000/NATURE/07/24/catfish.algae.ap/>
- Computing in the Humanities and Social Sciences, University of Toronto. (2007). *Economic outlook for Hong Kong in 2007*. Retrieved 11/17/07, 2007, from <http://www.chass.utoronto.ca/link/meeting/ctryrep/hongkong200705.pdf>
- Crawford, B. (2002). *Seaweed farming: An alternative livelihood for small-scale fishers?* Retrieved 12/02/2007, 2007, from http://www.crc.uri.edu/download/Alt_Livelihood.pdf
- Cristovam, M. L. (2000). *Industrial relations in the fishing industry*. Retrieved 11/17/2007, 2007, from <http://64.233.169.104/search?q=cache:3F1o7aKeuu8J:www.eurofound.europa.eu/eiro/2000/07/feature/pt0007101f.htm+fishing+problems+portugal&hl=en&ct=clnk&cd=2&gl=us>
- Economic Analysis Division. (2007). *Monthly report on the Hong Kong economy*. Retrieved 11/17/07, 2007, from

http://64.233.169.104/search?q=cache:QyJZO_YYl80J:www.hketotyو.gov.hk/japan/jp/english/mr0742_e/monthlyrep.html+unemployment+in+hong+kong+in+2007&hl=en&ct=clnk&cd=6&gl=us

Fiagbey, Emmanuel D.K. (1992-05). Community co-operatives and adult education in Scotland and Ghana: Some lessons from the developed and developing world. *International Review of Education*, 38(3), 275-380.

Fish Marketing Organization. (2007). *Wholesale prices of fresh marine fish*. Retrieved December 3rd, 2007, from http://www.fmo.org.hk/index/lang_en/page_price/

Government of Hong Kong Special Administrative Region Marine Department. (2007a). *Shipping companies*. Retrieved February 20th, 2008, from http://www.mardep.gov.hk/en/pub_services/sdfiles/shipcomp.html

Government of Hong Kong Special Administrative Region Marine Department. (2007b). *Shipyards/Ship Repairers*. Retrieved February 28th, 2008, from http://www.mardep.gov.hk/en/pub_services/sdfiles/shipyard.html

Government of Hong Kong Special Administrative Region Marine Department. (2007c). *Marine refuse and pollution*. Retrieved February 20th, 2008, from http://www.mardep.gov.hk/en/pub_services/ocean/pcu.html

Government of Hong Kong Special Administrative Region Marine Department. (2007d). *Mid-Stream Operators*. Retrieved February 28th, 2008,

from http://www.mardep.gov.hk/en/pub_services/sdfiles/midsoper.html

Harder, B. (2001-12). Fishy data hid decline in global catch. *Science News*, 160(22), 343.

Haulman, C. A. (1996-09). *Annals of the American Academy of Political and Social Science*, 547, 153-164.

HKCTU. (2005). *The right to minimum wage*. Retrieved November 10th, 2007, from <http://www.hkctu.org.hk/english/rights/wagerights.htm>

Hong Kong Economic and Trade Office. (2007). *Hong Kong's unemployment rate fell to 4.3%*. Retrieved 11/17/07, 2007, from <http://www.hketousa.gov.hk/usa/press/2007/mar07/032007.htm>

Hong Kong 2005. (2006). Retrieved 10/31, 2007, from http://www.panda.org/about_wwf/what_we_do/policy/policy_and_events/wto/hong_kong/index.cfm

McClenahan, T. R. (1987-08). Overfishing and coral reef degradation: A preliminary report from East Africa. *Conservation Biology*, 1(2), 97-99.

- Norr, J. L., & Norr, K. L. (1982). Impact of urban growth: Change in a South Indian fishing community from 1965 to 1980. *Ethnology*, 21(2), 111-123.
- Paz Campos Lima, Maria and Naumann, Reinhard. (2006). *Bipartite agreement on vocational training signed*. Retrieved 11/17/07, 2007, from <http://www.eurofound.europa.eu/eiro/2006/03/articles/pt0603019i.htm>
- People's Daily. (Thursday, May 11, 2000). *Hong Kong launches taxi training program*. Retrieved 11/4, 2007, from http://english.peopledaily.com.cn/english/200005/11/eng20000511_40565.html
- Pet-Soede, L. (2003). *Mariculture as a sustainable livelihood strategy in support of conservation and management - a case study of Komodo National Park, Indonesia*. Retrieved 11/12/07, 2007, from <http://govdocs.aquake.org/cgi/content/abstract/2006/101/1010040>
- Pollnac, R. B., & Carmo, F. (1980-01). Attitudes toward cooperation among small-scale fishermen and farmers in the azores. *Special Issue: Maritime Anthropology*, 53(1), 12-19.
- Sumaila, U., Cheung, W., & Teh, L. (2007). *Rebuilding Hong Kong's marine fisheries: An evaluation of management options*. 15(3) Retrieved 11/04/2007, 2007, from <http://www.fisheries.ubc.ca/publications/reports/15-3.pdf>
- Terkla, D. G., Doeringer, P. B., & Moss, P. I. (1988-02). Widespread labor stickiness in the New England offshore fishing industry: Implications for adjustment and regulation. *Land*

Economics, 64(1), 73-82.

United Nations Environment Programme. (2001). *Economic impacts of tourism*. Retrieved 11/29/07, 2007, from <http://www.uneptie.org/pc/tourism/sust-tourism/economic.htm>

United Nations System-Wide Earthwatch. (2006). *Crisis in ocean fisheries*. Retrieved November 9th, 2007, from <http://earthwatch.unep.ch/oceans/oceanfisheries.php>

Vice Minister of Commerce and Financial Secretary of Hong Kong. (2003). *Mainland and Hong Kong closer economic partnership arrangement*. Retrieved 11/15/2007, 2007, from http://www.tid.gov.hk/english/cepa/files/main_e.pdf

WWF Hong Kong. (2006). *SOS: Save our seas*

Xiao, J., & Tsang, M. C. (1999). Human capital development in an emerging economy: The experience of Shenzhen, china. *The China Quarterly*, (157), 72-114.

Appendices

Appendix A: What is an IQP

The Interactive Qualifying Project or IQP as stated by WPI is a project which "challenges students to address a problem that lies at the intersection of science or technology and societal structures or human needs." (WPI, 2007) The main goal of this project is to teach students how to understand the impact that their careers will leave on society. The IQP can also be done both on and off campus. The project that we are undertaking is one that deals with finding alternative livelihoods for the fishing population of Hong Kong as well as determining the feasibility of these livelihoods. This, just as WPI states, falls both within the realm of science and society. The main issue that is trying to be solved is the low population numbers of the fish and the related negative effects on the marine ecosystem of Hong Kong. Along with this scientific issue, the societal issue is that in order to help reverse negative effects of over-fishing we must find alternative livelihoods for the fishermen of Hong Kong. In order to do this we will need to use a variety of research methods, such as interviews and surveys, along with some scientific thinking in the field of modern technology. So between these topics, both of the requirements for WPI's IQP are met.

Benefits that they would never be able to obtain in a normal engineering institute. It teaches anthropological skills that also do not fall within a normal engineering curriculum such as social science research and writing methods. Also as previously stated, this project allows students to be able to see the results of scientific decisions in real world applications. Once the project has been complete, it will hopefully be able to give students a wider view of their engineering decisions.

Appendix B: World Wide Fund for Nature Fund Background

The World Wide Fund for Nature, a private non-profit organization, was formed as a charitable trust in Switzerland in 1961. Upon the WWF's creation they quickly adopted the mission statement, "to halt and reverse the destruction of our natural environment." With that mission in mind one of the greatest concerns to the organization is the marine biome and the quality of natural life there. With projects relating to marine life all around the world, one of the primary sites would be Hong Kong. The main problem that Hong Kong faces for marine wildlife is the over fishing and depletion of its once flourishing marine life. In this situation, the World Wide Fund for Nature is concerned with re-establishing the small fish populations that still exist by finding a solution for the over fishing. This is where the "Alternate Livelihoods for Fishermen" project comes in. The goal of this project is to find an alternate career path for the fishing population of Hong Kong to re-establish the no take zones and allow the fish population to reach healthy sustainable number. To complete the task of reclaiming the no-take zone and integrating new fishing ordinances, the World Wide Fund for Nature has established a campaign referred to as Save Our Seas, or SOS. Going beyond the idea of protecting sections of the ocean as the no-take zones, which only cover .016% of the local waters, the World Wide Fund for Nature has also proposed changes for both fishing licensing and fishing moratorium. The only downside is that these changes will not help to solve the entire problem. The Livelihoods project will hopefully help to relocate 800 fishermen to be able to help the fishing population recover faster.

To help the environment, especially pertaining to the fish population in Hong Kong, the World Wide Fund for Nature will use one of its independently operating satellite offices located in Hong Kong. The office is among a group of over 40 independently operating offices and over

4,000 employees, which can work together in joint projects. These global projects are controlled through either an office in Brussels or in Washington, DC, depending on the target of the project. Now looking at the smaller scale groups under the satellite offices brings up local community service groups. Each office has community service groups that it helps through volunteering and private funding. Along with these groups, the World Wide Fund for Nature also utilizes the help from many government departments and their resources such as the Agricultural and Fisheries Departments, in the case of Hong Kong, and the SOS program. In order for the World Wide Fund for Nature to be able to keep up participation and its offices, it has established 3 firm methods of obtaining income. These methods are donations, trusts, and government aid. The first 2 are from donated or collected money from individuals or groups. Government aid usually comes from certain departments, such as the Department of Agriculture in the United States, in order to have the World Wide Fund for Nature solve some environmental issue. The reason why they are asked to help is that the WWF has not only a large number of resources at their disposal, but they also are known globally as the largest environmental conservation establishment. In Hong Kong there are other organizations looking into the problem of over fishing such as the World Trade Organization, but the World Wide Fund for Nature is this project's primary consultant on this issue. These organizations also work together under the Save Our Seas campaign in order to solve the over fishing issue.

Appendix C: Survey of Fishermen

1. Age?

☐ 19 and younger ☐ 20-30 ☐ 31-40 ☐ 41-50
☐ 51-60 ☐ 61-70 ☐ 71-80 ☐ 81 and older

2. How much do you make either daily/monthly?

2a. Daily_____

☐ Below \$300 ☐ \$300 - \$500
☐ \$500 - \$1000 ☐ Above \$1000

2b. Monthly_____

☐ Below \$5000 ☐ \$5000 - \$10000 ☐ \$10000 - \$15000
☐ \$15000 - \$20000 ☐ \$20000 - \$25000 ☐ Above \$25000

3. How much does gas cost you daily?

HK\$_____

4. What part of Hong Kong do you fish in?

5. How many people live in your household?

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐

6. How many people in your household have jobs?

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐

7. How many of those with jobs are fishermen?

0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐

8. Do you own your own boat?

☐ Yes ☐ No

8a. If yes, what type of boat is it?

Stern trawlers

Pair trawlers

Fish/Crab Trappers

Purse seiners

Shrimp Trawlers

Gill netters

Long liners

9. Do you have a fishing license to fish in the marine parks?

☐ Yes ☐ No

10. Do you have a driving license?

☐ Yes ☐ No

11. Do fish year round? If not which months do you fish?

☐ Yes ☐ No

Jan Feb Mar Apr May Jun

July Aug Sept Oct Nov Dec

12. Do you speak English?

☐ Yes ☐ No ☐ Somewhat

13. Would you be willing to attend English classes in order to learn how to speak English?

If yes, what would be the best time of the day for you?

☐ Yes ☐ No

☐ 8-10am ☐ 10-noon ☐ noon-2pm ☐ 2-4pm ☐ 4-6pm ☐ 6-8pm ☐ 8-10pm

14. Are you full-time fishermen or part-time fishermen?

☐ Full Time ☐ Part Time

14a. If part-time, what is your other job(s)?

15. Would you be willing to work another job full time or just part time (and continue fishing for the rest of the time)?

☐ Yes, Full Time/Part Time

☐ No

16. If there were other jobs that pay the same as fishing would you be willing to switch? Why or why not?

☐ Yes, why? _____

☐ No, why? _____

16a. If no, how much money would you want to make per month in order to change to a different career?

HK\$ _____

17. If yes to 16 or 16a, would you be willing to attend training programs if necessary for these jobs? Why or why not?

☐ Yes ☐ No

17a. What time is the best time for you to attend these programs?

☐ 8-10am ☐ 10-noon ☐ noon-2pm ☐ 2-4pm

☐ 4-6pm ☐ 6-8pm ☐ 8-10pm

17b. Would you expect reimbursement for your time if the training programs were during the day?

☐ Yes ☐ No

18. Have you seen a decrease in number of fish caught in the last few years?

☐ Yes ☐ No

19. If yes, what do you think is the cause of this problem?

20. If the government was to establish a vessel buy back scheme would you be willing to give up fishing?

☐ Yes ☐ No

Appendix D: Interview with Stephen McDonough (Employment Agency in USA)

Interview Protocol:

What is the first thing that people do in the employment process once they come into your office?

Where does your funding come from as a government sponsored operation?

Approximately how long does an average job placement take, could you please explain your process?

Do you work closely with any other organizations?

Do you have specific programs for the elderly or older generations of Americans?

Are there any limitations to the current program?

Are there specific fields of work that you may deal with more than others in finding employment?

Do you have any specific programs for younger or youth individuals searching for employment?

Have you ever dealt with any cases from a fishing population?

Interview Transcript:

Stephen McDonough - Operations Manager

Location: Workforce Central, Worcester MA office

Date: November 19, 2007

Time: 3:00 PM

Interviewer: Brendan McMasters

Note Taker: Shannon Brooks

What is the first thing that people do in the employment process once they come into your office?

The very first thing that people do when they come in here is attend a mandatory seminar. Here we are able to go over possible job options and give individuals a brief overview of all of the job fields. Once that is over they will have a meeting with a job specialist who will better help them decide where they will be looking for work.

Where does your funding come from as a government sponsored operation?

Well as you already know we are a government funded organization. This means that all of our funding comes from both state and federal taxes. This provides us with enough funding to be able to support unemployed individuals in training programs

Approximately how long does an average job placement take? Could you please explain your process?

That's hard to say with the diversity of jobs that we deal with. It could take anywhere from one month to one year. See, we deal with both workers with very little formal education as well as workers who have gone through college and even have masters and doctorate degrees. As I already mentioned, the applicants sit in on a seminar to give them an idea of the career field

which they would be interested in working in. Once that is done, they will either sit with a job specialist to help them pick a career, or they will meet with a resume specialist to help them get back out into the field.

We have offices here to help them both to work on their resume and then also to search for new jobs as well as to apply for a new job.

Do you work closely with any other organizations?

Yes, there are a few organizations such as Job Corps in Grafton who we deal with very often but we don't usually work with other companies; it's more of a referral. What we do is for workers who for example are looking into a vocational skill, we can refer them to Job Corps who can give them the training and then even provide funding for those who need it for training programs.

Do you have specific programs for the elderly or older generations of Americans?

The main companies we work closely with are Operation Able and other Catholic charities. These groups are mainly focused on finding jobs for the elderly which they can easily excel in. Just like Job Corps, we also allow these companies to come into seminars to help inform the unemployed of careers that they will be able to apply for.

Are there any limitations to the current program?

As long as the individuals are motivated, then there aren't many limitations to the program. We are able to take in just about anyone as long as they qualify for unemployment or dislocated worker benefits. As I have mentioned before, we are also able to take in anyone from any level of formal or vocational education. We have even had lawyers and engineers come into the program that happen to be looking for jobs.

Are there specific fields of work that you may deal with more than others in finding

employment?

I would say that the majority of the applicants for the program are blue collar workers. We do have a wide variety of people who come in here but the majority of them are definitely blue collar workers. Do you have any specific programs for younger or youth individuals searching for employment? Usually we recommend them for specific state programs such as Job Corps. This program is designed to give vocational skills to individuals between the ages of 16 and 24. I know this is kind of a stretch for a Worcester office, but have you ever dealt with any cases from a fishing population?

No, we really haven't had to deal with that in the past, but we do have other offices that have. Take the Bedford office for example; they are located along side of many fishing communities, so they do deal with this a lot.

Do you think that re-employment agencies need to be region specific?

Yes, they do. Well, there are many similar jobs between the regions that we work with, so some of the information can be carried over, but there are jobs such as fishing which we just talked about that cannot. So there must be some level of region specific re-employment.

Appendix E: Interview with Dr. Yiu Ming Mak

Interview Protocol:

Has the AFCD made any attempts in the past to help fishermen find alternative livelihoods?

In your opinion how easy or difficult do you think finding alternative livelihoods will be?

What is the biggest problem you see the alternative livelihoods program facing?

Are the fishermen currently aware of an overfishing problem?

How much of the fishing industry are these fishermen supporting?

How do you think marine mariculture works as an alternative livelihood?

Do you think the government will be willing to give out more mariculture licenses?

Is the government willing to subsidize the cost of training or classes?

What do you think about the idea of seaweed or algae farming in Hong Kong?

Do you have any suggestions for other careers we might want to look at?

Thank you for your time and your assistance in our research.

Interview Transcript:

Mak Yiu-ming - Fisheries Officer

Location: AFCD Office, 100A Shek Pai Wan Rd

Date: January 14, 2007

Time: 1:00 PM

Interviewer: Brendan McMasters

Note Taker: Shannon Brooks, Olga Guizado, Katy Levinson

Has the AFCD made any attempts in the past to help fishermen find alternative livelihoods?

Yes the AFCD has made multiple attempts in the past to help fishermen find new jobs.

Unfortunately the options we have tried have not been successful. We attempted to train the fishermen to work as security guards but unfortunately it did not work out as well as planned.

In your opinion how easy or difficult do you think finding alternative livelihoods will be?

I think it will be difficult in, but mainly just in convincing the fishermen to leave. See, the fishermen can tend to be kind of stubborn and most of them will not be willing to learn a new skill besides fishing.

What is the biggest problem you see the alternative livelihoods program facing?

As I mentioned before convincing the fishermen to leave. As cited in the WWF's report the water that will be turned into no take zones is fished by local fishermen. What we have seen in the past is that even if the fishermen do not fish there anymore they will say they do so that no one will be able to take the water away from them. The way they see it is that by taking it away, you are taking away part of their livelihood and something that belongs to them.

I also can tell you that not all of the retraining programs will be able to be subsidized by the government. Right now the fishermen are in a situation where they are only unemployed for 2

months out of the year. The government sees this as being only “temporarily unemployed” and will not provide the aid which they will provide to unemployed individuals.

Are the fishermen currently aware of an overfishing problem?

As of right now the fishermen think there are a lot of other factors which attribute to the low populations of fish. Most of them think that there is not really an overfishing problem and that this can be attributed to pollution and other factors such as this. If they were to say they were aware of an overfishing problem they would probably see it as putting their own jobs at risk.

How much of the fishing industry are these fishermen supporting?

Currently the fishermen in Hong Kong are not supporting much of the fishing industry/fish market. Within Hong Kong 90% of the fish that you eat are imported from other places, whether it be mainland China, or the Philippines. If you begin to look at the fish that some of the fishermen are catching, most of them are almost too small to eat.

How do you think marine mariculture works as an alternative livelihood?

Marine mariculture has two main problems. First of all, the government is not willing to release any more licenses to fishermen because there are already so many people within the business of cultivating fish. The second problem is that there is a large amount of pollution created by cultivating fish, this is mainly due to a combination of both the byproducts of the fish themselves and the food that they are fed.

Do you think the government will be willing to give out more mariculture licenses?

No, this as I said before goes back to the issue of overpopulation in the business as well as pollution control. I believe if you could fix these problems they would reconsider, but probably not.

Is the government willing to subsidize the cost of training or classes?

Yes the government is willing to cover the cost of some of the training classes. Like I mentioned before we had tried the security guard training program. The negative side of this is that the fishermen need to attend 100% of the classes in order to qualify for the subsidy. Also, along with problems with the subsidies, the fishermen are also looking for some compensation for their time during training. Even though we tell them they will have a new job and make decent wages they still consider their time very valuable and need money for the time they are not fishing.

What do you think about the idea of seaweed or algae farming in Hong Kong?

The thing about this is that it has never been tried before in Hong Kong. This is mainly because the seaweed that is used is just taken off of the ocean floor during low tide in the summer. There has really not been a need for this industry. Also there are space issues in Hong Kong, even in the water. If this was to be tried there would need to be space allotted for it and Hong Kong already has many busy shipping ports.

Do you have any suggestions for other careers we might want to look at?

You could look at the marine tourism which they are trying in mainland China. The basic idea is that tourists are allowed to go out on fishing boats and actually fish with local fishermen. The only problem with this in Hong Kong is that the boats need to be made safer. You can't just allow tourists on the large trawlers and not expect an incident, especially with the equipment on board.

Thank you for your time and your assistance in our research.

Appendix F: Interview with Professor Ang Put

Interview Protocol:

What do you think of the new “no-take” zones being proposed by the WWF?

Do you think that overfishing is the main issue which has caused the decrease in fish population?

When did the fish populations begin to become at risk for population issues?

What do you think of the idea of farming seaweed or algae in Hong Kong?

What do you think of mariculture, both on land and in the ocean as alternative career choices for fishermen?

What would it take to be able to increase feasibility of mariculture in Hong Kong?

What in your opinion is the hardest part of providing alternative career options for fishermen?

Once these fishermen leave the industry, what are the chances the fish will return?

Thank you for your time and your assistance in our research.

Interview Transcript:

Put Ang - Marine Biology Professor, University of China, Hong Kong

Location: University of China Campus

Date: January 24, 2007

Time: 2:30 PM

Interviewer: Brendan McMasters

Note Taker: Shannon Brooks, Olga Guizado, Katy Levinson

What do you think of the new “no-take” zones being proposed by the WWF?

The no take zones are a good idea to be able to at least do something to protect the fish in the area. Even though these areas are being proposed it might not fully replenish the fish stocks.

Do you think that overfishing is the main issue which has caused the decrease in fish population?

Overfishing is definitely a major issue in Hong Kong. What has happened over the past few decades is that back in the 70's and 80's there was an overfishing issue which was not noticed. In recent years there has also been the added pollution which is making it very difficult for the fish to survive and reproduce.

When did the fish populations begin to become at risk for population issues?

This was back in the 70's and 80's because of all of the fishing that was taking place. But like I said before, it has gotten worse in recent years with the addition of pollution problems.

What do you think of the idea of farming seaweed or algae in Hong Kong?

The thing about seaweed farming is that it has not been tried in Hong Kong. If it were to be feasible an economically sustainable species of seaweed such as “Irish Moss” would need to be used. This is thought of as a delicacy in Japan and would be able to make profit. Unfortunately the farmers would also be competing with the mainland Chinese seaweed farmers who have

already begun to control the market.

What do you think of mariculture, both on land and in the ocean as alternative career choices for fishermen?

As you know the government is not allowing any more marine mariculture licenses in Hong Kong. So there would be the option of doing it on land. However land in Hong Kong is very expensive and just like the seaweed, a species of fish which could be farmed for a large amount of profit would need to be selected. Along with this, the more expensive species of fish which you would be trying to farm in pools on land are some of the hardest to grow in captivity. This would mean that much training would be needed. Right outside of this building we are trying to grow fish which can be sold but grown in captivity. The aim of the project is to try and make the farmed fish taste just like naturally caught fish.

What would it take to be able to increase feasibility of mariculture in Hong Kong?

You would need to control the pollution which mariculture produces from the nutrients needed for the fish. This could be done by using methods of combining seaweed with certain types of fish so both species would benefit and there would be less pollution. However you still run into the same problems as before with lack of licenses and a need for economically sustainable species.

What in your opinion is the hardest part of providing alternative career options for fishermen?

The hardest part is to get the fishermen into other industries. Most of the fishermen are going to be unwilling to change careers because of the uncertainty of their choice. It may be better to let them leave the industry on their own instead of trying to force them out.

Once these fishermen leave the industry, what are the chances the fish will return?

As I mentioned before there are also pollution problems which need to be looked at along with

the overfishing. The fish may in fact never return, we cant be sure of that. We also do not support reintroducing new species of fish into this ecosystem. Its more natural if we just let them see if they can reproduce by themselves.

Thank you for your time and your assistance in our research.

Appendix G: Interview with Star Ferry Company

Interview Protocol:

How many employees do you currently have working for Star Ferry?

Are you currently employing more people to work for Star Ferry?

Are there currently any programs that train people to work as boat drivers for Star Ferry?[]

Are there currently any programs offered that you know about for helping unemployed fishermen? If so what are they?

Would you be willing to employ fishermen that currently possess boat licenses to work in your agency?

What skills would fishermen need to have in order to qualify to work for Star Ferry?

Interview Transcript:

Star Ferry Employment Department

Via Email

Date: February 15, 2008

Interviewer: Olga Guizado

Note Taker: Brendan McMasters

How many employees do you currently have working for Star Ferry?

[Star Ferry: We have a workforce of 324 employees operating two franchised routes between TST/Central and between TST/Wanchai, two licensed routes between Hung Hom / Central and Hung Hom/Wanchai, and a licensed harbour tour ferry service.]

Are you currently employing more people to work for Star Ferry? [Star Ferry: The establishment of our crews is more or less the same in the past few years, and we have no intention to expand the establishment at this stage.]

Are there currently any programs that train people to work as boat drivers for Star Ferry?[Star Ferry: Internal promotion from Ferry Sailor to Coxswain or Ferry Engineer is always our priority. Therefore, various on-the-job training programs (e.g. customer services, basic shipboard safety, rope-work and seamanship, steering, collision avoidance regulations, watch keeping and lookout skills, etc.) plus related skill proficiency / enhancement courses (e.g. first-aid at sea, shipboard safety, fire-fighting, radio-telephone, radar operations, seamanship, etc.) offered by external institutes are provided to potential crews.]

Are there currently any programs offered that you know about for helping unemployed fishermen? If so what are they? [Star Ferry: We always welcome fishermen to apply for our openings of both ferry and pier crews. In fact, almost 40 ferry crews or more are ex-fishermen.]

Would you be willing to employ fishermen that currently possess boat licenses to work in your agency? [Star Ferry: same as Q4]

What skills would fishermen need to have in order to qualify to work for Star Ferry? [Star Ferry: Candidates should be proficient in speaking and reading Chinese with good service attitude and at least 3-year work experience. Preference will be given to those who have sea-going experience and related skill certificates.]

Appendix H: Correspondence Exchange with the Labour Department

Email sent to Labour Department:

To whom it may concern,

We are students from Worcester Polytechnic Institute who are working with the World Wide Fund for Nature (WWF) with the purpose of finding alternative livelihoods for fishermen in order to reduce over-fishing. We would really appreciate it if we could set up an interview with you so that you can provide us some insights about employment for middle-aged people in Hong Kong that we could use towards our research.

Thank you for your time,

Olga, Shannon, Katy, and Brendan

Response from Labour Department:

Dear Olga, Shannon, Katy and Brendan,

Thank you for your e-mail of 8.1.2008 addressing to various officers of the Employment Services Division of the Labour Department of Hong Kong.

As we have a busy work schedule at this time of the year, I am afraid that we could not accord to your request for interview. For your information, however, we would like to provide you an overview of the employment services offered by the Labour Department of Hong Kong below.

Through a network of 12 easily accessible district-based Job Centres and the Telephone Employment Service Centre, the Labour Department of Hong Kong provides a wide range of free employment services to cater for the needs of different categories of job-seekers including the middle-aged job-seekers. The Job Centres provide a modernized and well-equipped environment for job-seekers to complete the whole job-hunting process at one stop. Job-seekers can browse comprehensive and up-to-date vacancy information through the user-friendly vacancy search terminals. Telephones, fax machines and computers with Internet connection are also available in the Job Centres to facilitate job-seekers to search suitable jobs on the Internet and to prepare resumes and application letters.

Employment services are provided on the Internet round-the-clock through the Interactive Employment Services website (<http://www.jobs.gov.hk>) as well. Job-seekers can use a specially designed search engine of the website to look for their preferred jobs and obtain employment information readily at their home or office. For those who have already registered as members, they can further enjoy the service of getting summary information of the job openings meeting their selection criteria via e-mails.

Apart from the above, Job Matching Programme is also available to job-seekers requiring more

personalised and intensive employment services. Through the Programme, placement officers will help job-seekers evaluate their academic qualifications, job skills, work experience and job preferences, and encourage them to look for suitable jobs actively. Placement officers will also introduce suitable retraining courses to job-seekers where appropriate.

Targeting at job-seekers who are less competitive and who have difficulties in finding employment, two special employment programmes, namely the “Employment Programme for the Middle-aged” and the “Work Trial Scheme”, have been launched by the Labour Department of Hong Kong. Job-seekers meeting the relevant eligibility criteria are welcome to join the programmes.

The Employment Programme for the Middle-aged is geared to assisting the middle-aged job seekers in securing sustainable employment through targeted employment assistance and on-the-job training. Employers who engage job-seeker who is 40 or above in full-time permanent posts and offer him/her with on-the-job training will receive a training allowance of \$1,500 per month, for up to three months.

As regards the Work Trial Scheme, scheme participants are offered one-month work trial by the participating organizations. They will be paid an allowance of \$5,000 by the Labour Department, of which \$500 is contributed by the participating organization, upon satisfactory completion of the work trial.

Appendix I: Interview with Li Kung Fung (Fishing Family)

Interview Protocol:

How many of your family members are fishermen?

How old are they?

Have they ever tried to transition into new careers?

Do they speak English?

Would they be willing to change to another career, instead of fishing? Why or why not?

Do the fishermen think there is an overfishing problem in Hong Kong?

Where does your family fish?

How many people fish on the same boat?

Do you think that fishermen would be interested in a vessel buy back program?

Interview Transcript:

Location: Wan Chai

Date: February 7, 2008

Time: 2:00PM

Interviewer: Brendan McMasters

Note Taker: Brendan McMasters

How many of your family members are fishermen?

In my family the only one that is currently a fishermen is my father. That is just in my immediate family, I also have an uncle who is a fishermen.

How old are they?

My father is about 50 years old.

Have they ever tried to transition into new careers?

No, the way he sees it is that he only knows fishing and he has no interest in any other career.

This is because there is training associated and he is not sure he will be able to transition. I think that's the way most fishermen see it, is that they won't change because of the uncertainty of it working.

Do the fishermen think there is an overfishing problem in Hong Kong?

Most fishermen are unaware of this problem. They think that the low fish numbers is due to the pollution. Also a large number of them do not fish directly in Hong Kong, it is usually outside of Hong Kong in the South China Sea or around mainland China.

Where does your family fish?

They mainly fish in the South China Sea, this is because there are more fish there and the fish there are also bigger. This way they are able to make more money.

How many people fish on the same boat?

There are 5 people that fish in the same boat with my father. They have a trawler which they are able to take out to the South China Sea, and the trawler needs that many people to crew. That is another problem, as long as there is one fisherman who has a big boat, there will still be other fishermen who work as fishermen just to help him crew the boat.

Do you think that fishermen would be interested in a vessel buy back program?

I think the younger ones would be interested. This way they will have some money to help them get new jobs. The older fishermen would not be interested, this is because they see themselves as being too old to want to learn a new career.

Appendix J: Interview with Winnie Lee (Ex-fisher Family)

Interview Protocol:

How long was your family in the fishing business?

Why did your family decide to leave the business?

What career did they move to after leaving fishing?

Was it a difficult transition for them to leave fishing? How did they go about it?

If there was a decrease in catch or in pay, how severe was it?

What port did they fish out of?

Did your family own your own boat(s)? Did they work full-time?

Do they believe that are there too few, enough, or too many fishermen in Hong Kong?

Do the ex-fishermen in your family think Hong Kong is suffering from an over-fishing problem?

If so, in what ways? Is there too much fishing? Is there too extreme ways of fishing?

If so, do they have any ideas to improve the situation?

Do they think it is necessary to create marine protection areas for the fish or no-fishing zones?

Would this be effective?

Interview Transcript:

Winnie Lee - Member of Ex-fishermen Family

Electronic Communication

Date: February 22, 2008

Interviewer: Olga Guizado

How long was your family in the fishing business?

More than 40 years

Why did your family decide to leave the business?

High cost but low and unstable income

What career did they move to after leaving fishing?

Construction worker (my uncle and dad), chef trainee (dad), unemployed (my grandpa and grandma)

Was it a difficult transition for them to leave fishing? How did they go about it?

Yes. It is difficult to find new job as they were low education and low skill. Most of them went into the labor market to be a construction worker. But it was low and unstable income.

If there was a decrease in catch or in pay, how severe was it?

The fish stock was not enough to support their life. They sometimes needed to borrow money from friends.

What port did they fish out of?

A small port in Hang Hau, Tseung Kwan O. They used to catch fishes in eastern local waters such as Sai Kung, Tiu King Ling and Tseung Kwan O (but now the sea becomes a new town city after land reclamation).

Did your family own your own boat(s)? Did they work full-time?

They had one P4 (no engine) and one vessel. Yes, full-time work and fishing was their only livelihood.

Do they believe that are there too few, enough, or too many fishermen in Hong Kong?

There were too many fishermen in 1970s. But there are too few fishermen in Hong Kong nowadays.

Do the ex-fishermen in your family think Hong Kong is suffering from an over-fishing problem?

Of course the problem of over-fishing is very serious in Hong Kong and more even seriously than 1970s.

If so, in what ways? Is there too much fishing? Is there too extreme ways of fishing?

The market is bigger than before as people are wealthier than before. Fishermen usually catch fishes through trawling so all big and small fishes are caught.

If so, do they have any ideas to improve the situation?

Ban trawling fishing practice and over-fishing

Do they think it is necessary to create marine protection areas for the fish or no-fishing zones?

Would this be effective?

Although they support to set no-fishing zone in Marine Parks, they are worry that many of fishes will live in the no-fishing area and fishermen will still not have enough fish stock to support their life.

Appendix K: Map of Surveyed Area



Appendix L: Raw Survey Data

Survey	Age	Daily Income	Monthly Income	Gas Cost (y/n)	Area Fished	People in Household	Who Have Jobs	Who Are Fishermen	Do you own a boat	Type	Marine Parks License	Diving License	Fish Year round	Which months	Which months are best	Speak English	English Classes	English Class times	Full or Part	Switch for same pay	How much to switch	Training y/n	Training Time	expect reimbursement	Seen decrease in fish y/n	More Protected Areas	Visited by back y/n
1	40	300	10000	20	Lamma	5	5	2	Yes		Yes	No	No	5-10	No	No			Full	No	No	No	No	Yes	Yes	No	No
2	30	400	7500	20	Sai Kung	5	3	3	Yes		Yes	No	No	Not 6-7	No	Yes	8-10PM	Part	Yes	Yes	Any	Yes	Yes	Yes	Yes	No	No
3	40	300	15000	20	South China Sea	3	1	1	Yes		Yes	No	No	3-10	6-8	No	Yes	2-4PM	Part	Yes	Yes	12-2	Yes	Yes	Yes	No	No
4	50	200		15	Aberdeen	6	4	2	Yes	Small	Yes	Yes	Yes		No	No			Full	Yes	Yes	Any	Yes	Yes	Yes	Yes	Yes
5	40	500	8000	20	Cheung Chau, Lamma	7	4	3	Yes	Gill Netter	Yes	No	Yes		No	No			Full	No		15000	No	No	No	No	No
6	50	400		30	Stanley	5	3	1	Yes	Gill Netter	Yes	No	Yes		No	No			Full	No		10000	Yes	Yes	Yes	Yes	Depends
7	50	300	10000	25	Aberdeen	5	3	1	Yes	Shrimp Trawler	Yes	No	Yes		No	No			Full	No		20000	Yes	Yes	Yes	Yes	Yes
8	20	150	5000	10	Aberdeen	5	2	1	No		No	No	No	Not 6-7	No	Yes	2-4PM	Full	No			10000	Yes	No	Yes	No	No
9	50	150	5000	50	Tai Po	4	3	2	Yes	Long Line	Yes	No	Yes		No	Yes	No time	Full	Yes	No	No	No	Yes	No	Yes	Yes	Yes
10	50	1000	25000	120	Tai Po, Sai Kung	11	4	4	Yes	Small	Yes	Yes	Yes		No	Yes	No time	Full	No		No	No	No	Yes	Yes	No	No
11	40	400	8000	30	Tai Po	2	2	2	Yes	Small	Yes	No	Yes		4-8	No	No		Full	Yes		Yes	8-10PM	Yes	Yes	Yes	Yes
12	60	100	1000	10	Tai Po	3	1	1	Yes	Small	Yes	No	Yes		No	No			Full	No	No	No	No	No	Yes	No	No
13	50	300	4000	30	Tai Po	4	2	1	Yes	Small	No	No	Yes		No	No			Full	Yes		Yes	8-10PM	Yes	Yes	Yes	Yes
14	40	200	2000	20	Tai Po	2	1	1	Yes	Small	Yes	No	Yes		6-8	No	No		Full	No		Yes	8-10PM	Yes	Yes	Yes	Yes
15	60	200	3000	30	Tai Po	22	15	3	Yes	Small	Yes	No	Yes		No	No			Full	No	No	No	No	No	Yes	Yes	Yes
16	70			30	Sai Kung	2	1	1	Yes	Small	Yes	No	Yes		No	No			Full	No	No	No	No	No	Yes	No	No
17	40	300	10000	20	Sai Kung	4	2	1	No		Yes	No	Yes		No	No			Full	Yes		No	No	No	No	No	No
18	50		50000	80	Sai Kung	7	6	4	Yes	Shrimp Trawler	Yes	No	Yes		No	No			Full	No		20000	No	No	Yes	No	Yes
19	40	1000	20000	90	South China Sea	8	8	2	Yes	Shrimp Trawler	No	No	Yes		No	No			Full	No	No	No	No	No	Yes	Yes	No
20	30	200	5000	10	Aberdeen	5	2	1	No		No	No	No	Not 6-7	6-8	No	No		Full	No	No	No	No	No	No	No	No
21	40	500	60000	100	Aberdeen	7	6	6	Yes	Purse seiner	No	No	Yes		7-8	No	No		Full	No	No	No	No	No	Yes	No	No
22	40	400	30000	100	Aberdeen	6	4	4	Yes		No	No	Yes		7-8	No	No		Full	No		20000	No	No	Yes	No	No
23	50	300	8000	25	Sha Kei Wan	4	4	1	Yes		Yes	No	No	Not 6-7	No	Yes	8-10PM	Full	Yes		Yes	8-10PM	Yes	Yes	Yes	Yes	Yes
24	30	100		90	Marland China	6	6	5	Yes		No	No	No	Not 6-7	Somewhat	No	Yes	8-10PM	Part	No	10000	Yes	8-10PM	Yes	Yes	Yes	Yes
25	30	1000	25000	50	South China Sea	7	2	2	Yes	Shrimp Trawler	No	No	No	Not 6-7	6-8	No	Yes	12-2	Full	Yes		Yes	12-2	Yes	Yes	Yes	Yes
26	60	1000		50	Tai Po, Cheung Chau, Lamma Island	8	8	3	Yes		Yes	No	Yes		7-8	No	No		Full	No	No	No	No	No	Yes	Yes	No
27	40	1000	25000	50	South China Sea	7	2	2	Yes		No	No	No	Not 6-7	6-8	No	Yes	12-2	Full	Yes		Yes	12-2	Yes	Yes	Yes	Yes
28	30	1000		90	Marland China	6	6	5	Yes		No	No	No	Not 6-7	6-8	No	Yes	8-10PM	Part	No		10000	Yes	8-10PM	Yes	Yes	Yes
29	50	1000	25000	50	South China Sea	5	6	4	Yes	Shrimp Trawler	No	No	No	Not 6-7	6-8	No	Yes	12-2	Full	Yes		Yes	12-2	Yes	Yes	Yes	Yes
30	40	2000	60000	500	South China Sea	4	1	1	Yes	Shrimp Trawler	Yes	Yes	Yes		No	No			Full	Yes		No	No	Yes	Yes	Yes	Yes
31	30	1000		90	Marland China	6	6	5	Yes		No	No	No	Not 6-7	Somewhat	Yes	8-10PM	Part	No		10000	Yes	8-10PM	Yes	Yes	Yes	Yes
32	50	2000	60000	500	South China Sea	2	2	2	Yes	Shrimp Trawler	Yes	No	No	Not 6-7	4-8	No	Yes	8-10PM	Full	Yes		No	No	Yes	No	No	
33	40	4000	100000	200	South China Sea	10	10	5	Yes	Shrimp Trawler	Yes	No	Yes		4-8	No	No		Full	Yes		Yes	Yes	Yes	Yes	Yes	Yes
34	40	2000	25000	50	South China Sea	5	5	2	Yes		Yes	No	Yes		4-8	No	No		Full	Yes		Yes	Yes	Yes	Yes	Yes	Yes
35	40	5000	20000	200	Taiwan	2	2	2	Yes	Shrimp Trawler	No	No	Yes		No	No			Full	Yes		Yes	Yes	Yes	Yes	Yes	Yes
36	60	2000	25000	200	South China Sea	6	5	4	Yes	Part Trawler	No	No	No	Not 6-7	4-8	No	No		Full	No	No	No	No	No	Yes	Yes	No
37	40	2000	25000	50	South China Sea	5	5	2	Yes		Yes	No	Yes		4-8	No	No		Full	Yes		Yes	8-10PM	Yes	Yes	Yes	Yes
38	50			200	Cheung Chau	4	3	1	Yes	Shrimp Trawler	No	No	Yes		No	No			Full	No	No	No	No	No	Yes	Yes	Yes
39	40	2000	15000	400	South China Sea	4	3	2	Yes	Long Line	Yes	No	No	Not 4-5	No	No			Full	Yes		Yes	8-10PM	Yes	Yes	Yes	Yes
40	40			30	Cheung Chau	4	3	1	Yes	Purse seiner	Yes	No	Yes		No	No			Full	Yes		Yes	8-10PM	No	Yes	Yes	Yes
41	50	400	8000	40	Cheung Chau	3	3	3	Yes	Fishing Boat	No	No	No	Not 10-2	No	Yes	No time	Part	No		No	No	No	No	Yes	No	Yes
42	50	2000	20000	100	Marland China	5	5	5	Yes	Long Line	Yes	Yes	No	6-1	No	No			Full	Yes		Yes	8-10PM	Yes	Yes	Yes	Yes
43	60	1000	30000	50	South China Sea	3	3	3	Yes	Purse seiner	Yes	No	No	Not 3	No	No			Full	No	No	No	No	No	Yes	Yes	Yes
44	40	300	7000	20	South China Sea	6	3	2	Yes		No	No	Yes		No	No			Full	Yes		Yes	No	Yes	Yes	Yes	Yes
45	20	1000		150	Marland China	5	4	2	Yes	Shrimp Trawler	No	No	Yes		Somewhat	No			Full	No	No	No	No	No	Yes	Yes	No
46	40		30000	100	Marland China	6	3	1	Yes	Purse seiner	No	No	Yes		No	No			Full	No	No	No	No	No	Yes	Yes	Yes
47	40	2000	65000	150	Cheung Chau, Lamma	6	1	1	Yes	Purse seiner	No	No	Yes		No	No			Full	Yes		Yes	Yes	Yes	Yes	Yes	Yes
48	30	2000		150	Marland China	4	1	1	Yes	Purse seiner	No	No	Yes		No	Yes	8-10PM	Full	Yes		No	Yes	Yes	Yes	Yes	Yes	Yes
49	60	300	10000	20	Sai Kung	2	2	1	No		Yes	No	Yes		No	No			Full	Yes		No	No	No	No	No	No
50	50	100	5000	50	Tai Po	2	1	1	Yes	Small	Yes	No	Yes		No	Yes	No time	Full	Yes		No	No	No	Yes	Yes	Yes	Yes
51	40	400	30000	70	Aberdeen	7	5	4	Yes		No	No	Yes		7-8	No	No		Full	No		20000	No	No	Yes	No	No
52	60	2000	25000	200	South China Sea	6	4	3	Yes	Part Trawler	No	No	No	Not 6-7	No	No			Full	No	No	No	No	No	Yes	Yes	No
53	40	500	15000	30	Lamma	8	5	3	Yes	Gill Netter	Yes	No	No		No	No			Full	No		15000	No	Yes	Yes	No	No
54	70	400	8000	25	Lamma	13	4	2	Yes	Gill Netter	No	No	No	Yes		No	No		Full	No		10000	No	Yes	Yes	No	No

Appendix M: List of Boats



Small Boat with Outboard Motor

Also known as: P4, P4/7, or a small boat. They mostly fish with gill nets or long lines.

Mid-Sized Wooden Boat

These boats can perform a wide variety of fishing methods including: gill nets and long lines but most commonly purse seines. This photo depicts one of the larger boats.



Trawling Boat

These boats either work in pairs with a net suspended between them or trawl for shrimp and other fish individually.

House on Water

These floating houses generally have nets on them. They capture crabs and high-value fish and store previous catches.



Appendix N: Compiled Survey Data

		<i>Number</i>	<i>Fraction of Total</i>
Age			
	20-29	2	0.037037037
	30-39	7	0.12962963
	40-49	22	0.407407407
	50-59	14	0.259259259
	60-69	7	0.12962963
	70-79	2	0.037037037
	No Answer	0	0
Daily Income			
	100	2	0.037037037
	150	2	0.037037037
	200	4	0.074074074
	300	8	0.148148148
	400	7	0.12962963
	500	3	0.055555556
	1000	11	0.203703704
	2000	10	0.185185185
	4000	1	0.018518519
	5000	1	0.018518519
	No Answer	5	0.092592593
Monthly Income			
	1000	1	0.018518519
	2000	1	0.018518519
	3000	1	0.018518519
	4000	1	0.018518519
	5000	4	0.074074074
	7000	1	0.018518519
	7500	1	0.018518519
	8000	5	0.092592593
	10000	4	0.074074074
	15000	3	0.055555556
	20000	3	0.055555556
	25000	8	0.148148148
	30000	4	0.074074074
	50000	1	0.018518519
	60000	3	0.055555556
	65000	1	0.018518519
	100000	1	0.018518519
	No Answer	11	0.203703704
Gas Cost to Fill Boat			
	50	2	0.037037037
	100	3	0.055555556
	150	1	0.018518519
	200	8	0.148148148
	250	3	0.055555556
	300	7	0.12962963

	400	2	0.037037037
	500	7	0.12962963
	700	1	0.018518519
	800	1	0.018518519
	900	4	0.074074074
	1000	4	0.074074074
	1200	1	0.018518519
	1500	3	0.055555556
	2000	5	0.092592593
	5000	2	0.037037037
	No Answer	0	0
Area Fished			
	Aberdeen	7	
	Cheung Chau	6	
	Lamma	6	
	Mainland China	7	
	Tai Po	10	
	Sai Kung	6	
	Shau Kei Wan	1	
	Stanley	1	
	South China Sea	15	
	Taiwan	1	
People in Household			
	2	7	0.12962963
	3	4	0.074074074
	4	9	0.166666667
	5	11	0.203703704
	6	10	0.185185185
	7	6	0.111111111
	8	3	0.055555556
	10	1	0.018518519
	11	1	0.018518519
	13	1	0.018518519
	22	1	0.018518519
	No Answer	0	0
People in Household with Jobs			
	1	8	0.148148148
	2	10	0.185185185
	3	11	0.203703704
	4	8	0.148148148
	5	7	0.12962963
	6	6	0.111111111
	8	2	0.037037037
	10	1	0.018518519
	15	1	0.018518519
	No Answer	0	0

People in Household Who Are Fishermen			
	1	19	0.351851852
	2	15	0.277777778
	3	8	0.148148148
	4	6	0.111111111
	5	5	0.092592593
	6	1	0.018518519
	No Answer	0	0
Do you own a boat?			
	Yes	50	0.925925926
	No	4	0.074074074
	No Answer	0	0
Boat Type			
	Fishing Boat	1	0.018518519
	Gill Netter	4	0.074074074
	Long Liner	3	0.055555556
	Pair Trawler	2	0.037037037
	Purse seiner	6	0.111111111
	Shrimp Trawler	6	0.111111111
	Small	9	0.166666667
	Stern Trawler	5	0.092592593
Possess Marine Parks License			
	Yes	30	0.555555556
	No	24	0.444444444
	No Answer	0	0
Possess Driving license			
	Yes	4	0.074074074
	No	50	0.925925926
	No Answer	0	0
Fish Year round			
	Yes	34	0.62962963
	No	20	0.37037037
	No Answer	0	0
Which months			
	Not 6-7	14	0.7
	Not 4-5	1	0.05
	Not 10-2	1	0.05
	4>1	1	0.05
	Not 3	1	0.05
	5>10	1	0.05
	3>10	1	0.05
Which months are best			
	4>9	3	0.055555556
	4&8	1	0.018518519
	7>8	1	0.018518519
	7>9	3	0.055555556
	8>9	6	0.111111111

	No Answer	40	0.740740741
Speak English			
	Yes	0	0
	Somewhat	40	0.740740741
	No	50	0.925925926
	No Answer	0	0
Willing to Learn English			
	Yes	16	0.296296296
	No	38	0.703703704
	No Answer	0	0
Best Time for English Class			
	12>2PM	3	0.1875
	2>4PM	2	0.125
	8>10PM	7	0.4375
	No Time	4	0.25
Full or Part time Fishermen			
	Full	48	0.888888889
	Part	6	0.111111111
	No Answer	0	0
Switch for Same Pay			
	Yes	26	0.481481481
	No	28	0.518518519
	No Answer	0	0
How Much to Switch?			
	10000	6	0.230769231
	15000	2	0.076923077
	20000	4	0.153846154
	No	14	0.538461538
Willing to attend Retraining			
	Yes	23	0.425925926
	No	31	0.574074074
	No Answer	0	0
Best Time for Training			
	12>2PM	4	0.173913043
	8>10PM	11	0.47826087
	Any	2	0.086956522
	No Answer	6	0.260869565
Expect Reimbursement			
	Yes	27	0.5
	No	27	0.5
Seen Decrease in Fish Population			
	Yes	49	0.907407407
	No	5	0.092592593
Should More Protection Zones be Made			
	Yes	41	0.759259259
	No	13	0.240740741
Interested in Vessel Buy Back			
	Yes	33	0.611111111

	Depends	1	0.018518519
	No	20	0.37037037